ANIMAL KEEPERS' FORUM

The Journal of the American
Association of Zoo Keepers, Inc.
JULY 1997

ANIMAL KEEPERS' FORUM, 635 S.W. Gage Blvd., Topeka, KS 66606-2066
Phone: 1-800-242-4519 (U.S.) 1-800-468-1966 (Canada) FAX 913-273-1980

JULY 1997
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Managing Editor: Susan D. Chan • **Associate Editors/Enrichment Options Coordinators:** Kayla Grams, Arizona-Sonora Desert Museum & Gretchen Ziegler, Sequoia Park Zoo • **Book Review Coordinator:** Andrea Bernee, Chaffee Zoological Garden • **Legislative Outlook Column Coordinator:** Georgann B. Johnston, Sacramento, CA. • **ABC's Column Coordinator:** Diana Guerrero, San Diego, CA • **Reactions Column Coordinator:** William K. Baker, Jr., Lufkin, TX

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AAZK Executive Director: Ed Hansen, AAZK, Inc., Topeka KS

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About the Cover.....

This month's cover features Cathy, a African lion (Panthera leo) that resides at the Oakland Zoo,Oakland, CA and was drawn by Amy Burgess, a keeper at that facility. The lion has at least nine distinct vocalizations. The roar, which may be heard by people from up to five miles away, is usually given at sundown, then again after a kill and after eating. It apparently has a territorial function. The lion also proclaims terriroty by scent marking through urination, defecation and head-rubbing through brush. Lions live in family prides made up of related females and their offspring to which one or two males, oftentimes brothers, are attached. The males are usually only a true part of the pride during mating and remain to protect the territory and the cubs while they are very young. The cubs hunt with their parents after six months of age, but are not fully adult for six years. Thanks, Amy!

Information for Contributors

Animal Keepers' Forum publishes original papers and news items of interest to the animal keeping profession. Non-members are welcome to submit articles for consideration. Articles should be typed or hand-printed and double-spaced. Articles may be submitted on disk by arrangement with the Editor. All illustrations, graphs, charts and tables should be clearly marked, in final form and should fit in a page size **no greater than** 5.5" x 8.5" (14cm x 22cm). Literature used should be cited in the text (Brown, 1986) and alphabetically in the final bibliography. Avoid footnotes. Include scientific name (as per ISIS) the first time an animal name is used. Thereafter use common name. Use metric system for weights and measurements (standard equivalents may be noted in parenthesis). Use the continental dating system (day-month-year). Times should be listed as per the 24-hour clock (0800, 1630 hrs. etc.). Glossy finish black and white photos **only are accepted**. Color slides should be converted to black and white prints (minimum size 3" x 5" [8cm x 14cm]) before submission. Clearly marked captions should accompany photos. Please list photo credit on back of photo.

Articles sent to *Animal Keepers' Forum* will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for *AKF*. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed, appropriately-sized envelope. Telephone and FAX contributions of late-breaking news or last-minute insertions are accepted as space allows. However, long articles must be sent by U.S. mail. Phone 1-800-242-4519 (US); 1-800-468-1966 (Canada); FAX (913) 273-1980.

Deadline for each regular issue is the 10th of the preceding month. Dedicated issues may have separate deadline dates and will be noted by the editor.

Articles printed do not necessarily reflect the opinions of the *AKF* staff or the American Association of Zoo Keepers, Inc. Publication does not indicate endorsement by the Association.

Scoops & Scuttlebutt

Enrichment Committee Has Opening

The AAZK Enrichment Commitee announces that there is an available open position on the committee. Interested individuals may apply by letter stating their interest in the position and how they would like to contribute to helping the committee achieve its goals of providsing support and networking throughout the zoo community. Send letters of interest to: Dianna Frisch, Chair, 7731 Whitneyway Dr., Worthington, OH 43085.

AAZK Acknowledges Donations to Association

The AAZK Board of Directors and the staff of the Administrative Offices wish to thank the following Chapters for their donations: South Florida Chapter donated $275.00 to the general operating fund and the North Carolina Chapter donated $200.00 to the general operating fund. Continuing support by Chapters and individual AAZK members allows the Association to continue its financial recovery and makes the projects and programs of AAZK, Inc. possible. We sincerely appreciate this support.

Three Elected to AAZK Board in National Election

Nominations and Election Chair Sheri Leavitt, Houston Zoo, has announced the results of the 1997 AAZK Board of Directors election. Reelected to a second four-year term was Ric Urban, Houston Zoo; elected to their first four-year terms were Scott M. Wright, Cleveland Metroparks Zoo, and Jacque Blessington, Kansas City Zoo. These individuals will assume their Board duties at the close of the 1997 AAZK National Conference in Houston this October. Of the 1,495 ballots mailed to Professional members, 441 were returned in proper order and were tabulated by Shelly A. Smith, CPA, Friendswood, TX.

Janet McCoy and Michael Illig, both of Metro Washington Park Zoo, Portland, OR, will be retiring from the AAZK Board of Directors at the close of the Houston Conference.

Change of Address? Members Take Note

Please be aware that it is your responsibility to notify Administrative Offices as soon as possible of any change in your mailing address. Because the *Animal Keepers' Forum* is mailed nonprofit, bulk rate it is **not guaranteed** to be forwarded to your new address. Only First Class mail is routinely forwarded. While an address correction request from the Post Office is made for all *AKFs* mailed out, it may take several months before that address correction reaches our office. In the meantime, you will miss those issues of the journal. These missing issues **will not** be sent to you gratis if you have not submitted a timely change of address, but they are available for purchase at $3.00 per copy.

Message from the Executive Director

I am old. I have been a member of this Association for almost 18 years (which makes a lot of you older). I joined as an Affiliate member, back when I was a volunteer, hoping someday to get a job in the zoo and now, I have been in this profession long enough to have considered and discarded many career change opportunities. I have watched friends come and go, solved a couple of problems and probably even created a few. So, I'm entitled to reminisce before senility strikes.

Every once in a while, it is healthy, even fun, to reflect. When I looked back on AAZK, I saw a struggling membership organization striving to be on the same playing field with the big boys and girls. We chose to emulate AAZPA (AZA), AAZV and others, mirroring their methods and setting our goals, on our own level, but pointed slowly upwards knowing (hoping) that in time we would reach the top of the same learning curve. Know what? We're very, very close.

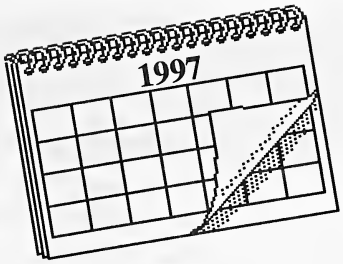
When I looked back, I saw at times, attempts to bring the goals of this Association into sharp focus for the membership. Those dedicated attempts usually suffered failure and were replaced by the need to avoid financial starvation and collapse. Not anymore. We are in the first year of a three-year program to ensure the financial stability of the Association and the light at the end of the tunnel ... well it isn't so dim anymore.

When I looked back, I saw membership apathy and confusion about where AAZK is heading. We continue to work on this, and what we have done, and will continue to do, is place the burden right back on your shoulders. If you want something, you have to tell us. The Board has recently drafted a five-year visionary statement, taking membership input and charting areas where we need focus for the future. When you have the opportunity to look this statement over, please do. I really would like to improve on the two-way dialogue with the membership. As I have said so many times before - it's your Association.

Make an old man happy.

Ed Hansen, AAZK Executive Director

Coming Events



AZA Annual Conference - September 14-18, 1997 - Albuquerque, NM. For further information contact Terry Axline, Albuquerque Biological Park, 903 Tenth St., S.W., Albuquerque, NM 87102 (505) 764-6200.

Annual Conference of the Association of Zoological Horticulture - September 25-October 1, 1997. Pre-conference tour choices (9/26/97) include a Horticultural & Historial Tour of Galveston or An Offshore Fishing Excursion. Post-conference tour(10/2&3/97) is a trip down Village Creek in the Big Thicket National Preserve and Village Creek State Park. For further information contact Gary Outenreach, Horticulture Exhibit Manager, Moody Gardens, 1 Hope Blvd., Galveston, TX 77554 (800) 582-4673, ext. 271.

Association of Zoo Veterinary Technicians - September 27-October 2, 1997, Asheboro, NC. Hosted by the North Carolina Zoological Park. For conference or membership information contact: Jenni Jenkins, LVT, AZVT Secretary, National Aquarium in Baltimore, Pier 3, 501 E. Pratt St., Baltimore, MD 21202, (410) 659-4256.

AAZK National Conference - October 5-9, 1997 in Houston, TX. Watch the *Forum* for information or contact Christine Smith or Ric Urban at the Houston Zoo, 1513 North MacGregor, Houston, TX 77030; (713) 520-3200.

Third International Conference on Environmental Enrichment - October 12-17, 1997 in Orlando, FL. For further information contact Thad Lacinak, Sea World, Inc., 7007 Sea World Dr., Orlando, FL 32821 (407) 363-2651.

American Association of Zoo Veterinarians Annual Conference - October 26-30, 1997 in Houston, TX at the Sheraton Astrodome. For conference information contact: Wilbur Armand, VMD, Executive Director/AAZV,6 North Pennell Rd., Media, PA 19063; Phone (610) 358-9530; Fax (610) 892-4813.

The 25th Annual Conference of the International Marine Animal Trainers Association - October 26-31, 1997 in Baltimore, MD. Hosted by the National Aquarium in Baltimore. For further information, contact Tim Sullivan, Brookfield Zoo, Seven Seas, 3300 Golf Road, Brookfield, IL 60513; (708) 485-0263, ext. 464, fax: (708) 485-3532; e-mail: tsulli@manta.nosc.mil.

18th Annual Elephant Managers Association Workshop - November 1-4, 1997 in Fort Worth, TX. For further information contact Steve Clarke, Fort Worth Zoo, 1989 Colonial Parkway, Fort Worth, TX 76110; phone (817) 871-7415; fax (817) 871-7012.

ChimpanZoo Annual Conference - November 15-19, 1997 in Little Rock, AR. For further information contact Mark Hartmann, Ph.D., Dept. of Sociology-Anthropology, University of Arkansas, 2801 So. University Ave., Little Rock, AR 72204; phone (501) 569-3176; or e-mail MAHARTMANN@UALA.EDU

New Professional Members

Gail L. Rice, **Beardsley Zoo (CT)**; Donald J. Boyle III, **Staten Island Zoo (NY)**; Danielle A. Wurst, **Erie Zoological Gardens (PA)**; David E. Williamson, **Salisbury Zoological Park (MD)**; Erin Van Lieu, **Virginia Living Museum (VA)**; Tina Blevins, **Zoo World (FL)**; Julie M. Poppell, **Riverbanks Zoo (SC)**; Brian E. Moore, **Santa Fe Community College Teaching Zoo (FL)**; Vicki Sikorski, **Discovery Island (FL)**; Sandi Redlich and Teresa Blouin, **Miami Metro Zoo (FL)**; Kerry A. Giersher, **Avicultural Breeding & Research Center (FL)**; Peggy Gann, **Knoxville Zoo (TN)**; Joanne Luyster, **Louisville Zoo (KY)**; David L. Frederick, **Columbus Zoo (OH)**; Robin Harkins, **Brookfield Zoo (IL)**; Shelly Brandt, **Binder Park Zoo (IA)**; Billie Reeves, **Wilderness Kingdom Zoo (IA)**; Eugenia Haynes, **Dallas Zoo (TX)**; Paula Kolvia, **Moody Gardens (TX)**; Caroline Crowley, **Ross Park Zoo (ID)**; and Roger Alink, **New Mexico Wildlife Association (NM)**.

New Contributing Members

Harold Wahlquist, U.S. Fish & Wildlife Service, Atlanta, GA

Renewing Contributing Members

Kathy De Falco, Volunteer, San Diego Zoo, San Diego, CA

John Bretton, San Diego Zoo, San Diego, CA

Renewing Institutional Members

Discovery Island, Lake Buena Vista, FL

CORRECTION: Last month's Professional Membership listing should have shown Jen Holmes at the Jacksonville Zoological Garden (FL). Our apologies for the typo.

Need to Reach AAZK?

1-800-242-4519 (U. S.)
1-800-468-1966 (Canada)
FAX: (913) 273-1980
or write
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Topeka, KS 66606-2066
U.S.A.

Administrative Office Staff

Barbara Manspeaker - Administrative Secretary
Susan Chan - Managing Editor AKF
Orca - Office Cat

Office Hours: 9:00 a.m. - 3:00 p.m. CDT

ABC's . . . .

Animal Behavior Concerns & Solutions

A Question and Answer Forum for the Zoo Professional

By Diana Guerrero, Independent Behavior Consultant,
Ark Animals of California, San Diego, CA

COMMENT/QUESTION

Thanks for all the help and time you spent with us on our behavior question. It might be useful to others if you included some of the questions you asked us on our evaluation in the ABC'S Column. We think it would be of benefit to other institutions if you did.

ANSWER

Thanks for the continued questions and positive comments/feedback! I will call this month's column: What information to provide to asure a beneficial evaluation!

EVALUATION TIPS: Knowing what questions to answer is half the battle! Due to space constraints it is not always possible to include some of the questions that are asked or discussed in the fact-finding phase of a behavior evaluation. Providing important information is a must in any evaluation. Here are some general guidelines to assist those of you who need help with scenarios. The more of these questions you provide answers to, in advance, the better and faster the assessment can be. Please remember that all specific items are kept confidential when presented in this column.

BEHAVIOR BACKGROUND INFORMATION

1) briefly describe problem
2) the age of the animal when the problem was first observed
3) how long the problem has been in existence
4) where it occurs and with which conspecifics
5) what particular situation it occurs in
6) frequency
7) how you have attempted to correct it
8) other things you think are important to know

HUMAN INFORMATION

Name of persons working on this problem:
Mailing address of institution (Street or P. O. Box):
City:
State:
Zip Code: Time Zone : P M C E Other_____
Work Phone: ( ) FAX Line: ( ) E-mail:

Other Participants M/F Relationship with animal(s) Time on area

1.
2.
3.
4.
5.

Does anyone have any behavior experience? Y__ N__ If yes, who?

Has anyone ever attended a training program or behavior seminar before?

Y_____ N_____

If Yes, who conducted the program or seminar? When?

INFORMATION

Please describe the exhibit to the best of your ability:

Can the animals be separated from each other?

Do they have individual night quarters?

Please list the other animals in the exhibit:

Name	Breed/Species	Age	Sex	Compatibility with

If you would like to submit a behavior question/scenario for discussion in this column, please use the guidelines listed above for providing information necessary for such an evaluation. Requests for behavior evaluations should be send to Diana Guerrero a t Ark Animals, Inc., P. O. Box 1154, Escondido, CA 92033-1154 or directed to her e-mail address listed below.

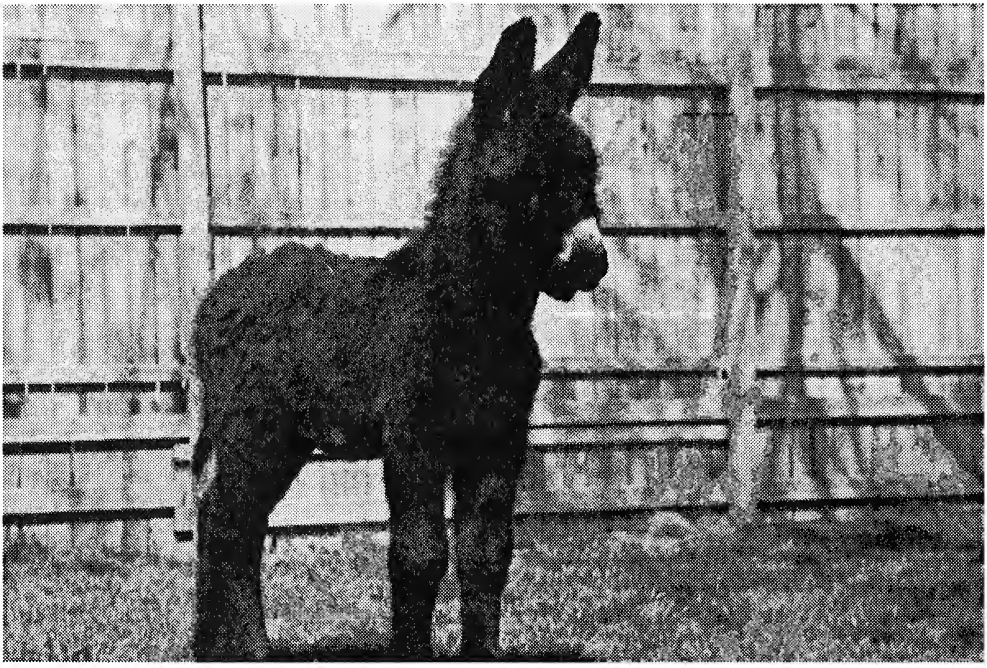
About the Author: Since 1978 Diana has been active both in the U. S. and England working with zoos, private collections, an oceanarium, a marine aquarium, and other animal-related organizations involving captive wildlife. She has a broad base of animal experience involving movie & television training, zookeeping, show performances with live animals, education, behavior management, modification and enrichment, rescue and rehabilitation as well as captive breeding and management of endangered species. She is currently working as an Animal Behavior Consultant and Trainer with both exotic and domestic animals, she has authored numerous articles on animal behavior and training. If you have questions for Diana, you may contact her at 1-800-818-7387 or via the email listed below. ***NOTE:*** *The Ark Animals' Website has completed the change to Electronic Magazine Format. The "Ezine" features articles related to captive animal behavior, enrichment, conservation, and similar topics. The publisher welcomes electronically submitted articles (previously published or new work). Deadline is the 10th of the month previous to publishing. Interested parties may contact the publisher at E-mail: arkabc@arkanimals.com Website address is http://www.arkanimals.com*

Rare Donkey Born in Ohio

submitted by Joan Druyor, Senior Mammal Curator,
African Safari Wildlife Park, Port Clinton, OH

On 28 March 1997, African Safari Wildlife Park experienced the first birth of a Poitou donkey foal (*Equus ssp.*). The filly, named Paris, is the daughter of Bridgette, and weighed in at 33.18kg (73 lbs.) and stands 135cm tall (4.43 ft.).

The Poitou donkey is one of the rarest domestic donkey breeds in captivity. The largest of all donkeys, an adult stands 15-17 hands tall (60-68 in.) and weighs in at well over 1,000 pounds (454kg). The Poitou also possesses the largest ears and the loudest bray of any donkey breed. Aside from its large size, the Poitou is most recognizable for its long, shaggy coat, which, when ungroomed, forms dreadlocks that hang to the ground.



The Poitou's temperment is friendly, affectionate and docile. The youngsters are shaggy and look almost like they're not real because their wool completely covers the entire body, including the face and ears. The Poitou donkey has historically been a rare breeds due to several reasons. First, the ancient breeders highly prized the animals and refused to sell any of them to outside parties, thereby creating their own monopoly. Secondly, the breeding practices and husbandry of the Poitou during ancient times was full of bizarre practices such as keeping male animals in dark stalls for their entire lives, only releasing them to breed. In turn, the animals did not fare well and, if a female became pregnant, the offpsring usually did not survive, or lived only a short time. Current animal husbandry practices have helped to increase the number of Poitou donkeys.

Viewpoint . . . . . .

Keeping the Faith

By Patricia Hainley, Zoo Keeper
Ellen Trout Zoo, Lufkin, TX

I remember the first career day presentation I gave as a zoologist, and those first graders changed my life forever. I realized that I had become a "celebrity" by virtue of my chosen profession, and that I had a very important role to play as an environmental educator. Those kids were fascinated by the fact that I was a dolphin trainer and also Lauren's mom. I was overwhelmed with the power and respect given to me by everyone in the room. I was a role model for children and adults alike, and I had a responsibility to meet the demands of the public in a professional manner.

During the next two years I was recognized again and again by people who had seen our dolphin show. Even today, four years after our show ended and I am living in another city, I was recognized last week by someone who remembered the show. I know now that the "celebrity status" wasn't because our show was that good or even because we were located inside an extremely popular amusement park, but rather because our show had real dolphins with which people could interact. At the time, Rowan and Cherie were the only performing Atlantic bottlenose dolphins in Texas. They were the celebrities and, as their trainers, we were too. Dolphins are creatures that for centuries have fascinated and captivated the human race.

I feel extremely fortunate that I was able to interact with such an incredible species in my first professional experience working with animals. I had daily opportunities that most people only dream about, and those dolphins became my best friends. That was the best job I ever had - unfortunately, I didn't know it at the time. Today I have to make a conscious effort not to let history repeat itself in this respect.

Zookeeping is a profession that attracts a variety of people for a variety of reasons. Lots of people are aware from a young age what their professional goals are, and groom themselves with a formal education to reach those goals. This may or may not include a species-specific field of study or research agenda. The opportunity to play an active role in planetary conservation attracts others. I happened to fall into the field by simply being in the right place at the right time, which happens frequently. Still others choose to work outdoors with animals rather than inside an office building with other people. The reasons for entering the profession are just as diverse as the reasons for staying.

Zoo Keepers are an inherently distinctive group of professionals - a fact to which my family can attest! As such, like speaks to like, and, once integrated into the subculture, many people feel at home. Although people may change institutions,

most will remain in the field of zoology. The opportunities for research projects and conservation studies are limitless, and provide avenues for outside interests. The public can be both a blessing and a curse, and zookeeping allows an individual to regulate the amount of interaction depending on their personal preference.

However, it is the self-reinforcing, self-rewarding aspect of zookeeping that holds most people in the profession. Working in a zoo is an extremely physically demanding job that requires self-discipline, self-motivation, and independent thinking. It is good, honest, hard work that provides the opportunities for direct and indirect animal interactions. The satisfaction in knowing that, due to my actions, a difference has been made for the better in an animal's quality of life, allows me to sleep very well at night.

Unfortunately, the reality of any profession is that there are always factors that interfere with the accomplishments and satisfaction of the day-to-day job. Zookeeping is no exception. I have seen too many good, motivated, idealistic, dedicated and professional keepers become dissatisfied, unmotivated, and disgruntled due to the inherent politics of a city-run institution. Perhaps if everyone took the time in their daily routine to "foster the wonder", then maybe positive attitudes would be more prevalent. I am acutely aware that sometimes it is difficult to focus on the positive, but it is those times I remind myself how lucky I am. I have the daily opportunity to interact with at least ten endangered species, and to participate in at least five SSP's. I am working on the front line in the war for planetary conservation. I may not be bringing home a large paycheck, but there are parts of my job that I would gladly do for free. I am empowered by my chosen profession and am a respected member of the community. I remember why I stayed in this field for the last six years and vow never to take any of it for granted again.

As professionals we must accept the things we cannot change, but work to change the things we can. We must all start within ourselves, for our attitude affects all those around us. Life is too short, and this job too demanding, not to be proud of what we do. The challenge is to find a way to focus all the negative energy into a positive and constructive manner. Take time to "foster the wonder" -- it is the single most important step in keeping the faith.

(The Viewpoint column offers our readers the opportunity to express their opinions on ideas and events related to zoos and zookeeping. Opinions expressed in this column are those of the author and do not necessarily reflect those of AKF or AAZK, Inc. It is at the Editor's discretion whether or not to place a submission in this column.)

REACTIONS

A Question and Answer Forum for the Zoo Professional on Crisis Management

By William K. Baker, Jr., Zoologist
Lufkin, TX

QUESTION

What precautions should staff members take in advance of a dangerous animal transfer or shipment?

COMMENTS

The care and management of dangerous animals in captivity requires specialized skills. This would include animal management, concentration, communication, and teamwork. The same can be said for the transfer and shipping of dangerous animals. Always stay with established procedures and avoid personal interpretation. Examples of this would include: "I know what the procedures are, but, this way is faster" or "It's always been done this way". Procedures for handling dangerous animals are usually designed to protect the staff and the animals. If a problem exists, then it should be addressed at the departmental level to effect a change in policy. Still, there are some general guidelines to follow when preparing to move dangerous animals.

DANGEROUS ANIMALS

1. Animal - Learn to recognize species-specific behaviors and what they mean, (i.e., primary signs of aggression). Also, each individual animal has its own unique personality that will set it apart from other animals in the collection. It's important to review animal and medical records to establish if the animal has any particulars that might affect a move. This would include a history of escapes or problem sedations. In short, know your animal.

2. Technique - The species type will to a great extent determine what method is chosen to move an animal. But, the animal history should be taken into account when deciding which technique to use. If the animal has a history of aggression and escapes then the best choice may be to use a dart rifle for the sedation. For larger specimens that are simply difficult to move, a standing sedation may be an alternative. Another option is the use of operant conditioning to desensitize

an animal to the transfer process. In some situations this may even eliminate the need for a sedation altogether.

3. Equipment - This is probably one of the most overlooked areas when it comes to moving animals. It is absolutely imperative that the equipment be inspected, tested, and repaired before it is used for a dangerous animal. This would include:

A. Inspect the fittings, bolt assemblies, mesh, and weld points on all holdovers and runways that are to be used. Inspect and test all shift doors and guillotines. Pay special attention to wires, pulleys, and counterweights. Make repairs and replace worn locks as needed.

B. Inspect and test manual and hydraulic squeezes. Look for stress points in the metal, tighten all loose parts, and replace all damaged parts with new ones. Lubricate all moving parts and hydraulics. Always make sure that all controls are out of reach of the animal and weld sheet steel over obvious gaps that the animal could utilize for contact.

C. Shipping crates should be animal-specific. Crates should be stored properly inside a building or warehouse to prevent weathering. Before a crate is used it should be closely inspected. Tighten all fittings and remove sharp edges from the interior. Use light to your advantage in the inspection process. Check the exterior and interior with a flashlight or close the crate with someone inside to check for gaps, (hopefully your fellow zoo keepers will let you back out!). If there are any doubts about the strength or stability of a crate, don't use it.

D. Many shippers and institutions use trailers that have been customized or designed for exotic animals. These are especially popular for hoofstock applications. Always inspect every square inch of a trailer for wear, loose fittings, and safety hazards. Personally, I prefer the double containment of a crate inside of the cargo area of a truck box for safety reasons. But, the important thing to remember is to never use a domestic stock trailer for exotics. It's unsafe, impractical, and downright dangerous.

4. Animal Care

Animals should have access to food and water if they are to be in transit for an extended period of time (more than 24 hours). Expect the water intake to increase in direct proportion to the degree of stress. Always watch for indications of severe stress or myopathy. If possible a veterinary technician and a familiar zoo keeper should accompany the animal during transit. It's a good policy to send along a portion of the current diet for the new facility to use in acclimating the animal to a diet conversion. Also, make sure that all paperwork (including ADT Form), health certificates, permits, and routing numbers are in order before shipment. Any of these can easily tie an animal up in red tape and increase transit time. Conduct transfers early in the day to provide a time buffer and avoid heat stress.

5. Crisis Management Precautions

Plan for contingencies, escapes, and injuries. It usually never happens, but it doesn't hurt to be prepared. If the animal has a background of aggression or escapes, it would be advisable to have extra darts or back-up dart rifles ready. Serious consideration should be given to the presence of an armed response in the event that the situation degrades and human life is threatened. This should be done discreetly and without interfering in the actual animal transfer. Transfers should be conducted early in the day before public hours and while other Zoo Keepers are in their respective work areas, (no sightseers).

CONCLUSION

Most dangerous animal transfer and transport operations go smoothly with limited risk to animal and staff. But, the staff should always be prepared for the unexpected. The best precautions are to use common sense, check everything twice, and go slowly. Always rely on your instincts and stop if something doesn't look right. Remember to make safety your number one priority. Dangerous animals are just that, dangerous.

NEXT MONTH: What precautions can zoo keepers take to make their daily work environment safer?

If you would like to submit a question for this column or have comments on previously published material, please send them to: Reactions/AKF, 635 S. W. Gage Blvd., Topeka, KS 66606-2066.

(About the author: Since 1985 Bill has been active in the fields of science, zoology and wildlife management. His education and experience include a B.S. in wildlife management and post-graduate studies in zoology, Lab and Museum Assistant, Shoot Team leader, ERT Member, Senior Keeper and Large Mammal Keeper at various AZA facilities. His area of research is crisis management in zoological institutions, which draws upon practical experience and training as a Rescue Diver, Hunter Safety Instructor, NRA Firearms Instructor, and Red Cross CPR/First Aid Instructor.)

M.A.R.C.-A Low Tech Solution to a Worldwide Problem

By Kathy Kelly, Silver Springs, MD
AAZK International Outreach, Project M.A.R.C.

M.A.R.C. (Making A Realistic Contribution) is an international outreach project sponsored by the American Association of Zoo Keepers, Inc. It began as an AAZK Chapter project at the National Zoo, Washington, D. C. (this chapter has since dissolved). M.A.R.C. became so successful in its mission that it is now an official service of AAZK, Inc.

M.A.R.C.'s original purpose was to supply free wildlife educational materials specifically to foreign zoos that were operating without the benefit of reference materials. It began, in September 1990, with twelve zoos. Currently M.A.R.C. has provided 34 foreign institutions with wildlife books, journals, scientific articles, wildlife magazines, and baby bottle nipples. M.A.R.C. has expanded to include wildlife sanctuaries, orphanages, nature reserves, wildlife clubs, Fauna Interest Groups, universities, and even an elementary school. These institutions are located in Asia, Africa, Madagascar, Europe, Central and South America.

All of the wildlife publications are the result of voluntary donations which require countless hours of sorting, cataloging, tailoring to specific institutions, packing, and mailing the boxes to their intended destinations. The materials are sent via M-bags which travel by boat, as space is available. Surprisingly this method works rather efficiently. It is the least expensive method of mailing and allows me to optimize my postage budget.

In most cases I have detailed information about the receiving institution but in other cases I know very little, usually because the request came from someone who visited the foreign institution and reported their need for help. The following information is a summary of the M.A.R.C. institutions to date:

Jardin Zoo, Argentina - 35% mammals, 50% birds, 15% reptiles. They are mainly interested in information about Brazilian animals and plants and environmental education. Specifically, they are interested in information about banded mongoose and pygmy hippos. They also wanted to know how to purchase wildlife tee-shirts. **They were so pleased with their mailings that they wrote back saying "do not hesitate to ask what you need from us..." and "...We appreciate your efforts to supply us so important tools for our job..."**

Patagonia, Argentina - Only exhibits indigenous species.

Sao Paulo Zoo, Brazil - 40% mammals, 40% birds, 20% reptiles. They are opening an aquarium and are trying to breed geckos. They are also interested in zoo

educational programs. **They responded, "The materials sent to them are being used by zoo staff, visiting biologists, students, and researchers". "Please accept our warmest thanks for this extraordinary delivery..." They also share the materials with other Brazilian zoos.**

Sao Leopaldo Zoo, Brazil - 20% mammals, 75% birds, 5% reptiles. They have a veterinary hospital but funding for journal subscriptions was cancelled in 1988. They are also interested in receiving information on: botany, architecture, and agronomy. **They responded, "The materials they've received are being used by zoo staff, visiting biologists, students, and researchers". "There is no way I can thank you for all the extraordinary deliveries we have received..., such materials would take us years to purchase by way of regular zoo budget appropriations..." and "... had to move their library to a larger room to accommodate the volume of mailings..."**

America Zoo, Brazil - This zoo heard about M.A.R.C. through the Brazilian grapevine and contacted me. Their entire focus is aimed at children's programs to teach conservation. They requested information on plants, animals, and the environment. Their objective is to teach ecology, the importance of conservation, and a respect for nature.

San Jose, Costa Rica - 30% mammals, 42% birds, 28% reptiles. They have a veterinarian, two biologists and two educators.

Biological Research Station and Natural History Visitor's Center, Tortuguero, Costa Rica - One of their primary objectives is to study and conserve nesting sea turtles. They are specifically interested in Costa Rican birds, butterflies, mammals, reptiles, and insects. They also requested general information on: tropical ecology, geology, biology, and park systems. They have: 2,000 species of plants, 400 species of trees, 250 species of reptiles and amphibians, 400 species of birds, 97 species of mammals, and 184 species of fish. **They responded, "...the materials will help educate and inspire the growing number of researchers, educators, and tourists that visit our compound..."**

Cuba - Approximately 800 pounds of M.A.R.C. material (mostly journals) were turned over to the Association of Systematics Collections (via Beth Hathaway) to be distributed among Cuban zoos.

Tallinn Zoological Gardens, Estonia - Their interests are in: conservation, biodiversity, and wildlife in general.

Kumasi Zoological Gardens, Ghana - 40% mammals, 30% birds, 30% reptiles. They are interested in keeper training materials and educational materials. They requested information on reproduction in cervidae, particularly the Royal antelope, a small, relatively undocumented African deer species. I did not have any donated materials on African antelope so I sent them one of my own books which, fortunately, had some information on the Royal antelope. **They responded, "...We have started a conservation education program for schools and the response is very encouraging..."**

Amazoo, Guatemala - This zoo routinely receives confiscated wildlife in very poor health. In 1990, Amazoo had no medical supplies, keeper tools or equipment, were short-staffed and had virtually no reference materials. Currently they serve as an information center for all Central and South America. They are especially interested in receiving journals. **They responded, "...Thanks to your donations our library is growing, and now we have a great variety of books and references for our members."**

Guyana - Three hundred pounds of M.A.R.C. materials were turned over to Dr. Lucy Spelman, NZP Associate Veterinarian, who hand-carried the materials to a zoo in Guyana where she, and a team of several other zoo/conservation professionals, spent a few weeks training the zoo staff about wildlife husbandry, veterinary medicine, graphics, wildlife management, behavioral enrichment, animal identification, fund-raising, etc. **The hand delivered materials are already housed in the building specifically designated as their zoo library.**

Point Calimere Wildlife and Birds Sanctuary, India - This sanctuary is reputedly visited by thousands of tourists, scientists, and wildlife experts. **The materials they have received are used by staff and are also made available to the sanctuary's visitors.**

Arignar Anna Zoological Park, India - This zoo received most of the wildlife materials enclosed in my third mailing to the Point Calimere Sanctuary but whose director was reassigned to initiate a new sanctuary in another location in India.

Coimbatore Zoological Park and Conservation Center, India - This institution was being newly created. They are interested in *in-situ* and *ex-situ* research and education. They are situated on degraded land adjacent to natural forest and central to many protected areas - their main interest is in conservation education. **They responded, "...I opened your boxes so eagerly to see the material and shuddered, that so valuable material and books you have sent us for our library, the materials are highly valuable for our library and for our staff and it was exactly what we were in need of at this stage..."**

Sri Sai Baba National Junior College, India - This junior college is interested in books on wildlife, medical topics, and pathology. They requested journals on the following topics: veterinary, avian, mammalian, and physical anthropology. They specifically requested copies of Science, American Scientist, Science News, Zoo Life, Natural History, and Audubon (which they know I have available).

Jakarta Zoo, Indonesia - 40% mammals, 45% birds, 10% reptiles, 5% amphibians/fishes.

Seoul Grand Park, Korea - 30.5% mammals, 65.9% birds, 3.6% reptiles, and have 20 groups of 20 species of insects. They specialize in lowland gorillas,

orangutans, chimps, and cranes. They requested information on: starting a natural history museum and breeding/management/feeding and disease treatment of wild animals.

Madagascar - About 400 pounds of M.A.R.C. materials were turned over to the Madagascar Fauna Group (via Dean Gibson) to be distributed among zoos in Madagascar.

The Wildlife Society of Malawi, Blantyre, Malawi - They have a large network of wildlife clubs. They offer presentations (videos and slide shows) about wildlife and its importance (they also offer visits to protected areas). They encourage club members to become involved in local conservation projects. They also have community outreach programs to teach indigenous peoples how to live near, and with, native wildlife. These programs involve drama, song, videos, discussions, and park visits. They teach activities such as: beekeeping, harvesting grass (for thatching roofs), and fruit harvesting. Their aim is to help communities realize the value of protected areas to the native people. **All the M.A.R.C. materials are available to Government departments.**

Park Zoologique National de Rabat, Morocco: 37% mammals, 60% birds, 3% reptiles. They specialize in Waldrap ibis, Dorcas gazelle and Gazella cuvieri. They expressed interest in staff exchange and are in desperate need of medical supplies. **They responded, "...On my own behalf and on the behalf of the staff of our Zoological Garden, I am delighted to thank you very much for undertaking such action..."**

Animal Orphanage, Nairobi, Kenya - The orphanage receives no funding. They need basic information on inexpensive exhibit design, wildlife natural diets and comparable captive diets, hand-rearing information and conservation education. **The materials they have received are housed at the African Wildlife Foundation's library where they are available to a wide audience. They responded, "...the rangers who run the orphanage really feel appreciated and respected now for what they do..." and "...Everyone wants to thank you and AAZK for the generosity of giving such a superb collection of books and magazines to the Animal Orphanage. Everything is interesting and valuable..."**

Zoological Gardens, Lahore, Pakistan - 23% mammals, 72% birds, 5% reptiles. They specialize in breeding primates, snakes, antelopes, deer, llama, zebras, peafowls, and pheasants. Their collection consists of: felines, antelopes, deer, giraffes, zebra, bears, primates, rhino, hippo, elephant, llama, yaks, peafowls, pheasants, vulturine, crown pigeons, waterfowl, pigeons, ostriches, cassowarys, emus, crocodiles, gavials, and snakes. They are interested in receiving publications on: veterinary medicine, animals, capture techniques, breeding, diets, and restraint (manual and medical) of wild animals. **They responded, "...thanks for the pheasant books donated for our upcoming breeding program...", and "...I have no words to express my gratitude for sending me a really instructive literature on medicine and surgery of South American camelids..."**

Parque de las Leyendas, Lima, Peru - 47% mammals, 36% birds, 16% reptiles. They specialize in South American species, i.e., spectacled bears, Humbolt penguins, vicunas, and Andean condors. Their park is divided into three areas: mountain, tropical forest, and coast or central area, representing the native animals of Peru from these three regions. They also have a small aquarium. The expressed interest in: zoo diets, exhibit design and wildlife management, veterinary and botanical information.

Zoologico Universidad CUSCO, Peru - This university has a small zoo (which is expanding) on its premises. They have: 15 species of mammals, 50 species of birds, and two species of reptiles. They specialize in Andean and Cloud forest animals and they have an education program (for adults and children). They exhibit: spectacled bears, pumas, ocelot, jaguar, spider monkeys, owl monkeys, capuchins, coati, opossum, small cats, Andean condors, vultures, owls, falcons, and Andean reptiles.

Antony Taggart, Miami, Florida (for Jefe de Zoologica del CTO, Peru) - Antony was originally a keeper in Australia but after he worked at this zoo in Peru he was so moved by their need for intervention that he decided to dedicate all of his energies to finding aid for this zoo. The zoo actually functions more as a sanctuary for indigenous wildlife that has been confiscated from poachers for illegal wildlife trafficking. The collection includes: wolly monkeys, marmosets, tamarins, capuchins, squirrel monkeys, ocelot, margay, puma, jaguar, coati, giant otters, tapir, peccary, squirrels, capybara, agouti, grisson, turtles, tortoises, boas, anaconda, caiman, amazon parrots, macaws, parakeets, toucan, herons, sunbittern, guan, and various fish. **Antony hand-carried about 400 pounds of M.A.R.C. materials to this zoo to ensure that they arrived intact.**

Parque da Quinta da Boa Vista, Rio de Janeiro - Their collection includes: opossum, kangaroos, bats, marmosets, tamarins, capuchins, howler monkeys, squirrel monkeys, spider monkeys, sakis, owl monkeys, hamadryas baboons, vervet monkeys, rhesus macaques, mandrill, orangutan, chimps, sloths, armadillo, squirrels, porcupines, mara, acuochi, agouti, tayra, grison, otter, hyena, puma, ocelot, jaguarundi, Geoffrey's cat, jaguar, tiger, lion, serval, jungle cat, Asian elephant, pony, zebra, tapir, white rhino, peccary, hippo, camels, alpaca, Sambar deer, giraffe, bullock, eland, nyala, blackbucks, and auodad. They are interested in veterinary and biology topics; they have an environmental education and research center, and are interested in herbivore diets. **This zoo was especially grateful for the baby bottle nipples which allowed them to successfully hand-rear a set of mountain lion twins whose mother had no milk after giving birth.**

Nature Reserve, Russia Far East - This nature reserve works with the Russian Dept. of Education. Their combined mission is to collaborate with other nature reserves and the school system to expand environmental awareness in the community. Their duties include: promoting ecotourism, designing an environmental resource center, completing an ecological museum, and developing a children's ecology group. They are working with the Peace Corps and feel that

lack of education is the weak link in developing a sustainable approach to conservation in their region. **They responded, "We believe these resources will truly benefit our efforts to increase environmental awareness in our community. We plan on using them as teaching aides during lectures and activities when school starts. Also, several people are using the materials to help improve their English abilities..."**

Seychelles Wildlife Clubs, Seychelles - Their prime objective is to educate young people about conservation of biodiversity. Their interests include: tropical biodiversity, conservation management, marine and coastal conservation, and environmental education.

Forest Gardens Program, Polonnaruwa, Sri Lanka - This is a nature reserve that received about 400 pounds of wildlife materials.

Johannesburg Zoological Gardens, South Africa - 42% mammals, 51% birds, 7% reptiles. **They responded, "...Even though we find the information extremely useful, I'm afraid we are not in a position to accept same from you anymore, as the rather exorbitant postage has to be paid by staff out of their own pockets (there should not have been any postage costs on the receiving end but at that time there was political unrest and the South African government could do anything it wanted). The zoo keepers are finding the Animal Keepers' Forum particulary useful, and have indicated that they will be applying for membership of AAZK".**

College of Wildlife Management, Moshi, Tanzania - This college specializes (and has succeeded) in training students in wildlife management. They are operating on a limited budget. Their interest include: ecology, ornithology, mammalogy, herpetology, soil science, first aid, range management, wildlife management, statistics, surveying and wildlife trafficking. **They responded, "...Our librarian has confirmed that our students are really going for these materials that you supply us..."**

Dusit Zoo, Bangkok, Thailand - 50% mammals, 30% birds, 20% reptiles. They specifically requested information about new techniques in feeding endangered species. It is actually composed of five zoos situated in each part of Thailand. They are interested in conservation education (for staff and visitors) and want materials on everything wildlife-related. They are expecting births in Burmese Brow-antlered deer (Eld's deer), Hog deer, Fea's muntjac, and Serow. They are also expecting hatchings in Painted stork, Scarlet ibis, peacocks, and pheasants. **They responded, "...the materials would be used to expand the knowledge taught to the visiting public and school children..."**

Universidad de La Republica, Montevideo, Uruguay - This university has a broad curriculum: 1) the role of zoologists in conservation, education, and propagation, 2) formation of a specialized library, 3) classification of species (use of keys), 4) choice of habitat and nutrition for the species, 5) marking of animals for identification, 6) management of species, 7) exhibition and

investigation of species from nocturnal habitats, 8) maintenance in captivity of fresh and salt water fish, 9) aquarium in the zoo, 10) maintenance of amphibians, reptiles, birds and mammals, 11) CITES legislation, 12) administration of a zoo (architecture and design), 13) exchange and purchase of animals, 14) role of the zoo biologist, 15) research (nutrition, reproduction, ecology, etc..), 16) direction of teaching assistants, training of teachers, and courses for biology students, 17) interchange on information with other biologists, and 18) conferences (how to make posters and billboards). **Upon receipt of the wildlife materials from M.A.R.C., they compiled a catalog list and circulated it to the 20 zoos in their province.**

Saigon Zoo and Botanical Gardens, Vietnam - Their library was destroyed during the war. They are lacking in knowledge of wildlife care and extinction.

Chipangali Wildlife Orphanage, Bulawayo, Zimbabwe - 80% mammals, 15% birds, 5% reptiles. They specialize in African hoofstock and carnivores and they serve the dual function of being a zoo and an orphanage. **They have instituted a conservation education program as a result of the materials they have received. They responded, "...We are most appreciative of your efforts and I, in particular, find the reading matter most informative and helpful when I am putting lessons together." and "...realize that their conservation lessons for the African school children need to broaden to include environments and wildlife worldwide..."**

These institutions have all received a complete library (at least three mailings, average combined weight of total mailings per institution=300 to 500 pounds) of wildlife publications. The institutions below (listed in the order that they were received) are waiting to receive M.A.R.C. materials.

STAEPA Education Center, Jamaica, West Indies - Its goals are to disseminate environmental information and educational materials; to promote wildlife protection in Jamaica; to provide wildlife materials to local youth organizations; to raise public awareness and support for environmental conservation through educational programs and community projects.

Laura Rosalvina, Peru - Requested information (especially journals) on birds, their behavior, diseases and migration.

Dr. Naomi Ish-Shalom, Israel - This person is teaching high school and college students without the benefit of library reference materials, is operating on a very tight budget, and is conducting zoology research without any support.

University of the Philippines, Philippines - Requested college textbooks on zoology and environmental science, wildlife books of any kind, avian/mammalogy journals, and the following specific publications: American Zoologist, National and International Wildlife, Zoo Life, Zoogoers, Science, and American Scientist.

Universiddad Nacional de Mar del Plata, Argentina - Professor Oscar Iribarne

is teaching ecology to undergraduates but in most cases NO reference literature is available.

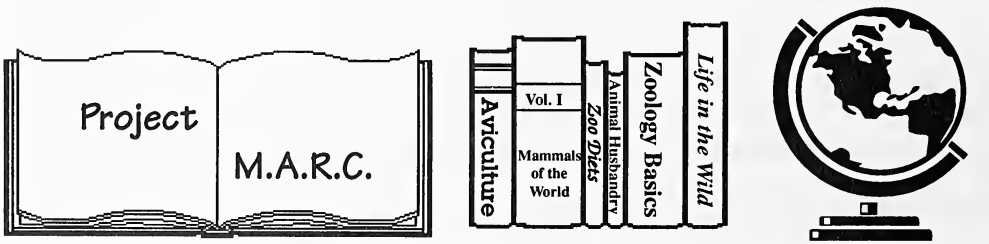
Limbe Zoo and Wildlife Rescue Center, Cameroon - Their focus is on environmental education, rescue and rehabilitation of endangered animals, particularly infant primates. Their collection includes: chimpanzees, lowland gorillas, drills, (one) mandrill, Preuss' monkey and Red-eared monkey (Cercopithecus), White-collared mangabeys, and several other endangered primates, dwarf crocodiles, soft-shelled turtles, duikers, and viverridae. They receive no government support but are looking to renovate their enclosures, receive veterinary supplies and medicines, they need reference books, articles and educational materials for their educational program (for adults and children).

African Safari, Puebla, Mexico - Requested advice on developing educational programming at Mexican zoos.

Recognition of some of M.A.R.C.'s major contributors:

AAZK National Headquarters (Topeka, KS), World Wildlife Fund, NZP staff, Friends of the National Zoo (FONZ) volunteers, Armed Forces Institute of Pathology (Walter Reed Army Hospital), Rocky Mountain AAZK Chapter (Denver Zoo), Greater Baltimore AAZK Chapter (Baltimore Zoo), Andrew Main (1993 AAZK Atlanta Conference delegate), National Parks and Conservation Association, and countless private individuals.

M.A.R.C. spawned from a simplistic idea; it is time and energy intensive but the reward of helping to make a difference is immeasurable. Unfortunately, 1992 was a minimally productive year for M.A.R.C. because my mom was diagnosed with a terminal disease in the spring and she died in the fall. I spent all of my time with her so M.A.R.C. was put on hold. Unfortunately 1996 was also a bad year for M.A.R.C. because I became ill with multiple health problems that precluded my being able to work at either my job or on this project for over nine months. I am not recovered yet but I am back to working on M.A.R.C. I wish to thank everyone who has ever helped, in any way, to make this project succeed. A special thanks goes out to the AAZK Board of Directors for voting to assume sponsorship and making Project M.A.R.C. a service of AAZK's International Outreach. I believe education will be the foundation for change, progress, and unity in conservation efforts worldwide.



American Association of Zoo Keepers &
Zoo Registrars Association
1997 National Conference October 5 - 9
Pre- and Post Conference Trips

If you are planning to take one of the pre- or post-conference trips, you may find the following information helpful.

The two-day pre-conference trip to Dallas, Fossil Rim, and Fort Worth will depart from Houston early on the morning of Friday, October 3. To guarantee being here on time, you should plan to arrive in Houston on Thursday, October 2. The guaranteed conference hotel rate is good for three days prior to the October 5 start of the conference.

The Saturday, October 4, pre-conference trips will also depart early, and, therefore, you should probably plan to arrive in Houston the night before.

The one-day post conference birding trip will return to the hotel in the early evening. Unless you have very late transportation from Houston, you may wish to stay overnight on Friday, October 10. The guaranteed conference hotel rate is good for three days after the October 9 conference ending.

The two-day post-conference trip to San Antonio and Sea World will return to Houston late in the evening of Saturday, October 11. Although you will not need a hotel room in Houston for the night of Friday, October 10, you will probably need a reservation for the night of Saturday, October 11. The guaranteed conference hotel rate is good for three days after the October 9 conference ending.

Space is limited for each of these trips, and will be filled on a first-come basis.

Finally, although zoo keepers know the value of comfortable walking shoes, you may not realize that mosquitoes and hot sun can be factors in Houston in October. So insect repellent and sun screen are definitely in order --- and, of course, binoculars.

1997 AAZK National Conference
Houston, Texas
October 3 - 10, 1997

HOTEL REGISTRATION FORM

Name_____

Address_____

City_____State/Province_____

Zip Code _____-_____ Phone (_____)_____

Rooms will held until 4PM only, unless guaranteed* with a major credit card.

Diner's Club ____ Master Card ____ AmEX ____ Discover _____ Visa _____

Card Number _____ Expires _____

* To guarantee your reservation, your credit card will be charged for one night's room & tax on the date we enter your Reservation. Once guaranteed, there will be no refund for cancellation within 72 hours of arrival.

ROOM RATES:

_____ 2 Double Beds $69.00

_____ 1 King Bed $69.00

Arrival _____

Departure _____

Check-in 3:00 P.M.

Check-out: 12:00 NOON

$10.00 per additional person.

Not responsible for roommates.

Rates subject to 15% Occupancy Tax.

Parking at the Sheraton Astrodome is free for those registered at the hotel.

To make reservations by phone dial 1 800 627-6461

Please return this form to:

Attn. Reservations Dept.
The Sheraton Astrodome Hotel
8686 Kirby DR
Houston, TX 77054-2804

Registrations are due by Friday Sept 12, 1997

1997 AAZK/ZRA National Conference

Houston, Texas
October 5 - 9, 1997

CONFERENCE REGISTRATION FORM

Name_____

Address_____

City_____ State/Province_____

Zip Code _____ _____ Phone (_____)_____

Zoo Affiliation_____ Position/Title_____

AAZK Chapter_____ AAZK Membership Status_____

Number of AAZK Conferences you have attended_____

AAZK Committee Member?_____

Presenting a Paper/Poster/Workshop Session? YES NO

Title_____

Participating in Zoo Olympics? YES NO

Bringing a Silent Auction item? YES NO

OPTIONAL ACTIVITIES (extra charges involved):

Need table in Exhibitors Hall? YES NO

Pre-Conference Trip A - Birding the Texas Gulf Coast YES NO
Cost $40

Pre-Conference Trip B - Dallas Zoo/Fossil Rim/ YES NO
Fort Worth Zoo, 2 days **Cost $125**

Pre-Conference Trip C - San Antonio Day Trip YES NO
Cost $40

Post-Conference Trip A - Birding the Texas Gulf Coast YES NO
Cost $40

Post Conference Trip B - San Antonio Zoo/Riverwalk/ YES NO
Sea World of Texas, 2 days **Cost $125**

Vegetarian? YES NO If so, what kind?_____

T-shirt? YES NO Size: S __ M __ L ___ XL ___ XXL ___

FOR INTERNAL USE ONLY

AU rcvd _____ **$** _____ **#** _____ **Full** _____

Day _____ **S M T W T Confirm** _____ **Refund** _____ **HC** _____

CONFERENCE FEE SCHEDULE

AAZK Member	$125.00*	_____
Member's Spouse/Companion	$125.00*	_____
Non-Member	$150.00*	_____
Non-Member's Spouse/Companion	$150.00*	_____
Late Fee (Registrations postmarked after August 1, only applies to full conference registration.)	$25.00	_____
Exhibitors Table Fee # of Tables_____ (1 table $125 nonmember, $50 member/ $25 additional table)	$	_____

DAILY RATES

Sun. Oct. 5 - Icebreaker	$30.00	_____
Mon. Oct. 6 - Papers, dinner at the zoo	$30.00	_____
Tues. Oct. 7 - Zoo tour & lunch, workshops	$30.00	_____
Wed. Oct. 8 - Moody Gardens, Zoo Olympics	$35.00	_____
Thurs. Oct. 9 - Papers, lunch, banquet	$35.00	_____
Daily Fee - Specify which day(s)_____	$	_____

TRIPS -- No reservations for Pre or Post Conference trips accepted after August 1.

Pre-Conference Trip A - Sat. Oct. 4	$40.00	_____
Pre-Conference Trip B - Fri. & Sat. Oct 3 - 4	$125.00	_____
Pre-Conference Trip C - Sat. Oct. 4	$40.00	_____
Post-Conference Trip A - Fri. 10	$40.00	_____
Post-Conference Trip B - Fri. & Sat. Oct. 10 - 11	$125.00	_____

TOTAL FEE ENCLOSED $_____

A $25 handling fee will be charged for refunds prior to September 1, 1997. **NO** refunds after September 1, 1997.

*Fee includes $25.00 contribution to AAZK National.
Fee does not include cost of Conference Proceedings.

Please make checks payable (in U.S. funds) To : **AAZK/ZRA Conference 1997**

Send Registration Form and all fees to :

AAZK/ZRA Conference '97
Liz Turner/Beverly Hawkins
Greater Houston Chapter of AAZK
Houston Zoological Gardens
1513 N. MacGregor Dr.
Houston, Texas 77030-1603

Do You Recycle?

(A Survey)

The 1996/1997 Aquarium and Zoo Maintenance (AZMA Conservation Committee is focusing on the statement "Recycle, Reuse, Reduce". We have compiled five questions regarding several conservation subjects and we would like to find out what zoos and aquariums are doing in each conservation area. If your organization does not participate in any of the areas, we would like to know that too. Please reply by sending your response to Mary Wykstra-Ross **by 15 August 1997**. You may be as brief or as detailed as time permits.

The Commitee will compile the results of the completed questionnaires and present the results at the 1997 AZMA Conference in Phoenix. Feel free to include diagrams, photos, or slides to help us in organizing our presentations.

Please write, call or e-mail if you have any questions. Thank you for your responses. Send to: Mary Wykstra-Ross, Utah's Hogle Zoo, 2600 E. Sunnyside Ave., Salt Lake City, UT 84108; (801) 584-1714; email:mwykross@xmission.com

COMPOST:

1. Does your organization compost?
2. What materials are included in your compost? What is the mixture ratio?
3. What is the space that is allotted or required for your compost system?
4. What is the design of your compost system?
5. What is the (approximate) cost to set up your system? Can you estimate the yearly savings to your organization by in-house composting?

BUILDING MATERIALS

1. Does your organization recycle or reuse building materials?
2. What building materials are recycled or reused on a regular basis?
3. Describe any completed project in which recycled products have been used.
4. What method is used by your organization for end product recycling? Do you have any ideas for internal (within your zoo) recycling projects?

UTILITY CONSERVATION

1. Does your organization recycle or reuse water, sewerage or energy?
2. What method(s) of utility conservation is utilized at your organization?
3. Describe the design of your recycling/conservation project.
4. What is the (approximate) cost for setting up your conservation system?
5. What is the (estimated) cost and savings for your organization by using your conservation system?

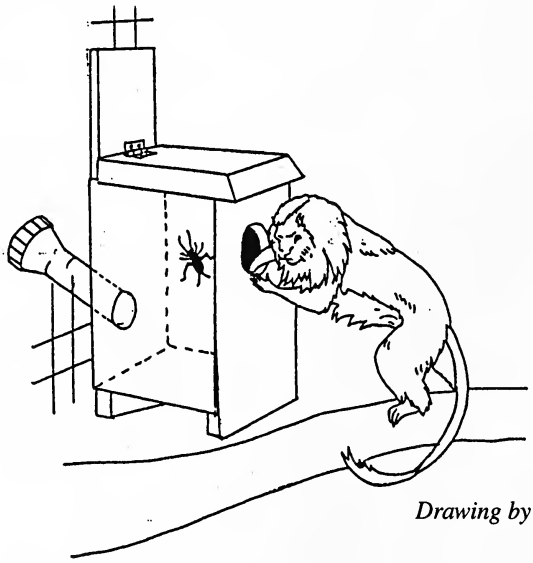
CARDBOARD, ALUMINUM, PAPER & PLASTIC (CAPP)

1. Does your organization recycle or reuse CAPP?
2. What method(s) of recycling CAPP is utilized at your organization? (Individual bins on grounds, back area containers, outside contractor...)
3. Where are your CAPPs taken for recycling?
4. What is the (approximate) cost or income to your organization as a result of recycling CAPP?
5. Does your city/county/community support recycling programs for CAPP?

By Kayla Grams, Arizona-Sonora Desert Museum
and Gretchen Ziegler, Sequoia Park Zoo

PRIMATES: This was a very popular enrichment devise used for dispensing live crickets --- favorite of the Golden Lion Tamarins previously housed at Wildlife Safari, Winston, OR. It consisted of a simple, wooden bird house (donated by the Oregon Fish and Wildlife Dept., so check your local sources) in which a diagonally slanted hole was drilled into the back to fit a 60cc syringe case. In our case, the box was mounted on the wire with hooks, easily removable for thorough cleaning.

Crickets were placed in the syringe case and periodically and randomly fell into the box.



Drawing by Gena Bentall - Wildlife Safari

Our tamarins used this cricket feeder successfully, and abundantly, returning often to check for treats even once the feeder was empty.

— Judy Harkleroad, Sr. Keeper
Wildlife Safari, Winston, OR

A Golden Lion Tamarin reaches into the Cricket Feeder in hopes of securing a treat.....

Photos by Dot Irvin
Wildlife Safari

Success! The Golden Lion Tamarin's persistence pays off with a cricket.

(Ideas appearing in this column have not necessarily been tested by the editors for safety considerations. Always think ahead and use good judgment when trying new ideas. Eds.)

Enrichment Notebooks Now Available to Individuals

The AAZK Enrichment Committee, under the direction of Dianna Frisch (now retired keeper/Columbus Zoo) gathered enrichment ideas and information and, with generous underwriting from the Columbus Zoo, put together an Enrichment Ideas Notebook. This Notebook was made available to institutions at the 1996 National AAZK Conference held in Detroit, MI. The remaining inventory of the Enrichment Notebook has been transferred to AAZK Administrative Offices in Topeka, KS.

Institutions have had the opportunity to order this resource notebook at a minimal cost for postage for the past three months. **AFTER 1 July 1997, institutions can no longer order this book at the $10.00 price. The price after 1 July for institutions is $35.00 (domestic); $45.00 (overseas and Canadian).**

AAZK, Inc. now wants to make the Enrichment Notebook available to individual members who wish to have their own copy. Copies will be available to AAZK members for $25.00 (which includes domestic and Canadian postage). The price for non-members is $30.00. Checks or money orders should be made payable in U. S. funds to AAZK, Inc. Credit card orders may also be placed by calling 1-800-242-4519 (U.S.) or 1-800-468-1966 (Canada). Complete the form below for mail orders and send to: Enrichment Notebook/AAZK, 635 S. W. Gage Blvd., Topeka, KS 66606. These notebooks will be available on a first-come, first served basis until sold out.

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The Captive Maintenance of the Indian Monitor (*Varanus bengalensis*) Daudin in India

By
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Abstract: In December 1992, three hatchling *Varanus bengalensis (*1.2) were brought to the Department of Zoology, D. E. I. Dayalbagh, Agra. The hatchlings weighed 40gm (1.4 oz.) each and measured (SVL) of 15cm (5.9 in.). For the first month the monitors were kept in a holding area 1.5m x 2.0m (4.9 x 6.56 ft.) and later transferred to one measuring 6m x 6m (19.8 in. x 19.8 in.). Identification of the sexes was done using probing. The monitors were fed twice a week and weight/length ratio of 10:2 gm/cm was recorded. They were active during warm weather. No evidence of mating could be recorded but combat was observed regularly from December 1992 - February 1993.

Introduction

The common Indian monitor (*Varanus bengalensis)* is found across all biotopes from evergreen forests to the borders of deserts. It has distribution throughout India (Auffenberg, 1994) and also in Pakistan, Sri Lanka, Nepal, Myanmar, Bangladesh, Iran and Afghanistan (Smith, 1935). The wild population is estimated at greater than one million (CAMP Report, 1994). Populations of this species appear to be declining due to illegal trade and habitat destruction (Biswas & Sanyal, 1977; Whitaker and Khan, 1982; Das, 1988; Gupta et al, 1993; Gupta, 1995). This species is diurnal and lives in burrows, rock crevices, hollows of tree trunks, thickets and crevices around abandoned buildings.

At present this species is listed in the CITES (Convention of International Trade in Endangered Species of Wild Fauna and Flora) as endangered, prohibiting international trade (IUCN Red Data Book, 1994). The Indian Wildlife Protection Act (1972) lists it in Schedule I. This species is kept in unknown numbers in Indian zoos and there is no reported success in reproduction.

Materials and Methods

Lizards were kept in an enclosure measuring 6m x 6m (19.8 in.x 19.8 in.). A large floor area is important for housing this species (Cuningham and Gilli, unpub.) The top of the enclosure was covered with a layer of chicken mesh and the sides and front were covered with weld mesh. The floor was made of concrete for easy cleaning. A sand bed at a depth of 1m (3 ft.) was provided in a 0.8m x 0.8m (2' 7" x 2' 7") area to allow the monitors to dig. This also allowed them to dig sand holes in which to lay eggs. Monitors in the wild frequently dig retracting

burrows in stream banks, inaccessible to land predators (Auffenberg, 1983).

The enclosure was furnished with a pool of water 0.7m x 0.7m (2' 3" x 2' 3") which was large enough to allow for complete immersion. A rectangular hide box measuring 1.5m x 1.5m (4' 11" x 4' 11") and made of hard wood with a wire mesh on its sides and sufficient in size to hold all three monitors, was also provided. The floor of the box was packed with husks for insulation. The substrate in the hide box was changed once a week.

During the day, sunlight was available in the enclosure and during the night the husk fibers maintained temperature. When the conditions were extremely cold, a 100-watt flood lamp was provided day and night in the enclosure.

The enclosure was also equipped with wood branches for perching. They were mainly used for basking, as monitors in the wild bask on logs. In the wild, logs also provide perfect 'refuges' for monitor lizards. The enclosure was also furnished with native vegetation.

In the monitor lizards natural habitat, temperatures vary from 48° C to 6° C (118° to 42° F) or lower. Humidity does not appear to be a major factor in *V. bengalensis* husbandry when compared with desert monitors (*Varanus griseus*).

The monitors were fed twice a week with field rats, beef, crickets, grasshoppers and albino white rats. Bird eggs were also provided as most of the varanids are known to be egg predators (Bayless, 1993). Each animal was provided with 50-70gm (1.7 - 2.1 oz) of meat. Monitors were also offered regular calcium and phosphorous supplements. All individuals did not eat for the first two weeks. Prior to being served, the food was frozen for at least a week to kill any *Salmonella* these food items may carry. In the wild, the lizards feed on frogs, fishes, lizards (*Calotes versicolor*), snakes (*Amphiesma stolata*), turtle and bird eggs, field rats, carrion and sometimes on scorpion also (Smith, 1935; Auffenberg, 1983; Daniel, 1983; Krishna, 1992; Gupta. *per. obser.*). Reports of gut analysis of these lizards has revealed animal remains in addition to plant material (Krishna, 1992).

Upon receiving the monitors, morphometric details such as body length (BL) and weight were recorded. This was done using a meter long thick thread. Strimple (1990) in his study on *V. exanthematics* had used a meter stick for measurements which may not be as accurate. Weight was taken by keeping the lizard in a gunny sack, using a spring balance. Monthly weight/length ratio of growth was 10:2 gm/cm.

Observations on the monitors' behavior were made twice each day. Monitors do not appear to be social. They were observed spending more time in the open and basking during the day than in the hide box. They were active during warm weather when behaviors included climbing up the enclosure wall, tongue-flicking, marking and digging a tunnel, as well as raising their bodies off the ground, depressing or flattening the body, inflating the throat pouch, hissing

and lashing out with their tails. Aggressive behavior, defecation, open-mouthed charge were common when we entered the enclosure to feed or do observations (see Fig. 1).

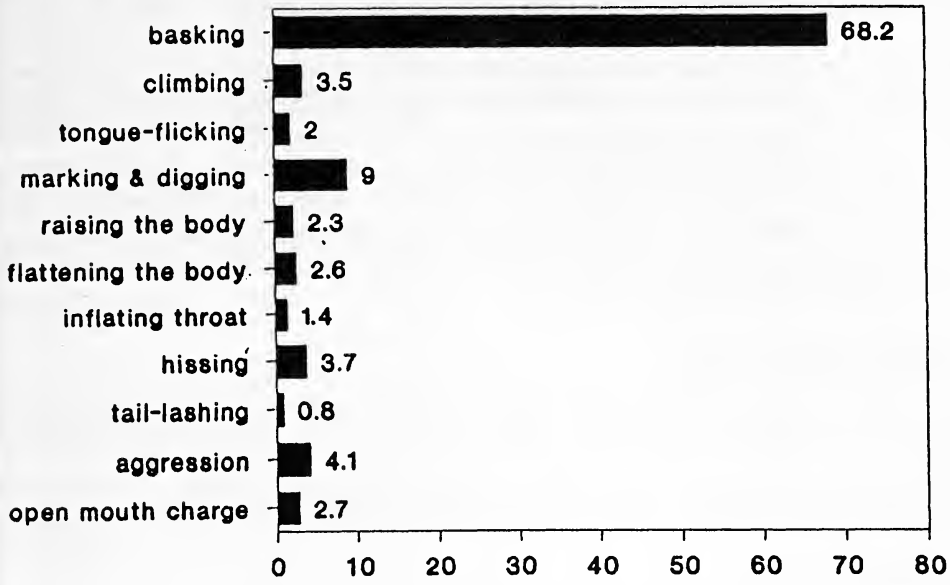

Figure 1. V bengalensis: % comparative behaviour

No evidence of mating could be recorded which is probably due to the specimens being sexually immature. However, courting behavior was frequently noted during our observations. The male was seen clawing at the backs of the females and the females were observed scent-marking. During courtship the male apparently defines a territory. Combat behavior, similar to the 'combat dance' in snakes, was also observed. The most common behavior in such combat sequences was for the lizards to stand on their hind legs and clasp its opponent firmly above the neck and shoulders. They were observed biting on the nape of the neck, but without drawing blood.

As the breeding season varies from country to country (Smith, 1935) in India eggs (usually 25-30 in number) are laid from January through April. While it is reported that this species has bred in captivity in India, there is no published report of such an occurrence available. In the wild, the smaller species of monitors like *V. griseus* breed several times a year while the larger ones like *V. bengalensis* (with the exception of *V. salvator*) breed only once or twice a year (Horn and Visser, 1989). According to Sprackland (1989), *V. bengalensis* have been bred regularly in captivity, though their large size (1.2m/approx. 4ft.) at maturity may limit reproduction in some facilities.

Results and Discussion

Diet plays an important role in breeding monitors in captivity. Previous work by Auffenberg (1994) has shown that in captivity, male Bengal monitors eat

more and for a longer time period than do the females. Males also grow faster and to a greater size than females. Our investigation, however, showed that the food requirements of both male and female did not show significant differences, with both sexes consuming the same amounts.

It is also suggested that individuals hatched from the same habitats and raised from hatchlings together in captivity may well make the most reliable breeding pairs. Separation of the sexes is however necessary to induce breeding. These lizards should be maintained in a large natural habitat enclosure which is escape-proof, hygienic and as free from stress factors as is possible in captivity. Our study showed that the monitors remained in good health when fed live prey. Our observations also concluded that courtship behavior in these monitors begin prior to attainment of sexual maturity.

Acknowledgements

We are thankful to Dayalsaran, Vinay Kumar and Puneet Wanchu for their assistance. Thanks are also due to Indraneil Das. Editor, *Hamadryad*; N.V.K. Ashraf of Coimbatore Zoological Park, and S. Bhupathy of Salim Ali Centre for Ornithology & Natural History for comments on the manuscript.

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Cotton-top Tamarin Husbandry Manual Available

The Cotton-top Tamarin SSP produced a three-ring husbandry manual in 1995. It contains information on natural history, social organization, reproduction, infant development, captive management, nutrition, veterinary care, research and references. A copy was sent to the SSP representative at each participating zoo.

If you care for cotton-tops, but do not have access to a copy of the manual, there are three options open to you. First, ask the Cotton-Top SSP representative at your zoo. Second, you may connect to the Cotton-top SSP website (http://www.selu.com/~bio/cottontop/). As a last resort, contact me and I will make special arrangements to get this vital information to you. Be aware that production and mailing costs are extremely high for this manual, and the SSP would prefer to spend its limited funds on field conservation projects, so please first pursue the free avenues (CTT SSP Rep and Website). Or contact: Warren W. Pryor, Animal Curator, Fort Wayne Children's Zoo, 3144 Sherman Blvd., Fort Wayne, IN 46808; Voice - (219)427-6807; fax - (219) 427-6820; e-mail - Warrenwp@aol.com

First Breeding in North America of South Georgia Pintail

By Christian Newton, Senior Aviculturist
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On 24 April 1995, Mike Lubbock and the staff of Sylvan Heights Waterfowl reported the successful hatching and rearing of three South Georgia pintails (*Anas georgica georgica*). The South Georgia Pintail is a sub-species separated from the Chilean pintail (*Anas georgica spinicauda*). The South Georgia pintail range along the Georgian Islands and are fairly common and are seen in good numbers. This little pintail is smaller, browner, with more spots along the breast which helps distinguish it from the Chilean pintail. A brighter yellow bill with a slight upward curve is another difference that helps with identification.

In 1981, Mike Lubbock arranged with Peter Prince, a member of the British Antarctic Survey Team working in South Georgia, to rear a number of live specimens to be brought back to the United Kingdom. Peter was set up with an incubator, provisions to make rearing pens, and chick starter crumble. He was successful and reared a small group of pintail from two different broods. The birds had to be held a good six months longer because of the Falkland Island War which prevented anyone from leaving South Georgia. An English television team was also stranded on the island. They helped to look after the birds and eventually brought them out when the war ended. These four specimens arrived at the Wildfowl and Wetlands Trust and proceeded to breed the following year.

Nineteen-ninety-three was the first opportunity for Sylvan Heights Waterfowl to obtain a pair of birds from the U. K. The pair survived the quarantine and laid a clutch of four eggs, which, however, proved infertile. This was due to the male not pairing with the female, but being more intent on breeding with a Falcated duck. The following year, he paired successfully, and in April of 1995, three of the four eggs laid successfully hatched.

The four pale brown eggs were laid in a groundbox measuring 30.5cm x 30.5cm x 25.4cm (12" x 12" x 10") which had a porch around the entrance to insure privacy. During the breeding season, the male utters a high pitched whistle while courting the female. The female South Georgia pintail incubated the eggs for about 15 days. The eggs were then transferred to a broody bantam for six days. They were put in a hatcher right before hatching.

The babies were very heavily downed due to the harsh and cold climates of the South Georgia Islands, a trait not common in puddle ducks. As the chicks grew, because of the heavy down, the heat was reduced much earlier than normal. The babies are much darker in color than their counterpart, the Chilean pintail. However, they learned to eat and drink and be just as curious as the Chileans.

It is interesting to note that, in the wild, the mother and young may feed on kelp, krill, or even a fur seal carcass, but we found that Start and Grow Crumble® worked just as well.

The young were healthy and grew rapidly. Sylvan Heights Waterfowl is pleased to report that the young of 1995 were joined by two more chicks in 1996. This established three breeding pairs. They may be related, but being the only bloodlines in North America offered very few other options. Some different bloodlines would be better, however, such birds that are endemic to small islands may be an exception. Examples, such as the Laysan teal, were once down to one female and one clutch of eggs. With protection and captive rearing, the Lysan teal has been brought back to a healthy population.

Sylvan Heights Waterfowl has been awarded first breeding recognition by the International Wild Waterfowl Association and by APWS.

Information Please

The Oakland Zoo is seeking information from facilities with naturalized moats and ponds. We are interested in any advice regarding plant species, fish species and maintenance tips. Any help would be greatly appreciated. Please send informationto: Amy Burgess, Oakland Zoo, 9777 Golf Links Rd., Oakland, CA 94605.

Bowling for Rhinos T-Shirt Available

Once again, talented Janie Coleman, Dallas Zoo staff graphic artist, has designed our 1997 Bowling for Rhinos T-shirt. This new black and teal design on a white T-shirt features four different species of rhinos to represent the sanctuaries that Bowling for Rhinos funding supports. These T-shirts are selling for $12.50 each. For further information contact Ann Stevens at the Dallas Zoo (214) 670-6798 or Fax (214) 670-6717.

Legislative Update

Compiled by Georgann Johnston
Legislative Advisor
Sacramento, CA
1-800-338-7348

Norway Proposes Deal With Southern African Countries To Allow Reciprocal Whale And Elephant Killing

Norway is asking several Southern African countries to support its request to allow resumption of whale hunting in exchange for Norway's support of the African countries request for reinstatement of the ivory trade. These requests were to be part of the CITES convention in Zimbabwe last month.

Specifically, Norway proposed to downlist minke whales from Appendix I to Appendix II, which would allow limited hunting of the species for oil and other whale by-products. Norway was joined in this proposal by Japan.

Norwegian whaling commissioner Laare Bryne recently toured the countries of Zimbabwe, Namibia and Botswana — which were requesting that they be allowed to hunt elephants for ivory on the grounds that their elephant populations are now too large to qualify for Appendix I listing. A report in the Cape Times, a South African newspaper, characterized the offer by Norway as a "We will let you kill elephants if you will let us kill whales" bargain. The Norwegians objected to this "trade-off" characterization by saying that "We are not exchanging elephants for whales. The African elephants in some areas are so numerous that they can well sustain limited hunting. They are actually damaging crops and [pose a risk] to the human population."

Source: Cape Times Newspaper 21 May 1997; The Star, Independent Newspaper of Africa, 16 May 1997; Animal People: News for People Who Care About Animals, June 1997

Interior Department Reaches Agreement For Purchase Of Lands In Kenai Fjords National Park And Alaska Maritime Wildlife Refuge

On 19 May 1997, Secretary of the Interior Bruce Babbitt signed an agreement with an Alaska Native Corporation to purchase lands in Kenai Fjords National Park and the Alaska Maritime National Wildlife Refuge. All of these lands are located within the boundaries of the State of Alaska and comprise a total of 32,537 acres. The purchase price was just over $15 million and the lands will now be under the jurisdiction of the National Park Service. Under the terms of the purchase, shareholders in the Alaska Native Corporation will retain subsistence hunting and fishing rights on a portion on the lands.

The areas acquired provide important habitat for many species injured by the

1989 Exxon Valdez oil spill. Pink salmon, sea otters, harlequin ducks, black oystercatchers, pigeon guillemots and marbled murrelets are just a few of the animals residing in the area.

Fourteen million dollars of the purchase price comes from a civil settlement with Exxon with the funds being administered by the Exxon Valdez Oil Spill Trustee Council. The total settlement was $900 million.

Source: Interior Department Press Release 19 May 1997

South Africa Proposes Stricter Hunting Controls

The Minister of Environmental Affairs and Tourism for South Africa, Pallo Jordan, announced recently that stricter hunting regulations will be adopted in areas where illegal hunting activities are being practiced. The announcement followed the broadcast of a documentary news program on South African television which graphically depicted "canned" lion hunting in areas supposedly patrolled by the South African Police Service.

Jordan stated that "canned" hunts such as those depicted in the program did not take place in public game reserves but were limited to private game farms where it is much more difficult to monitor illegal practices. This statement was refuted by the producers of the television program.

Source: Bushcraft Mag-e-Zine, published on the Internet by WildNet Africa, 29 May 1997

Wildlife Habitat In Russia Safe From Gold Mining, At Least For Now

The Volcanoes of Kamchatka area in eastern Russia, home to the Siberian sable, white-shouldered eagle, black-capped marmot, lynx, snow ram, and a number of other species has recently been designated as a World Heritage Site by the United Nations World Conservation Congress. The resolution was endorsed by 70 governments and 600 non-governmental organizations.

The designation was critical in stopping, at least for the time being, a plan by the U. S. Overseas Private Investment Corporation (USOPIC) to fund a gold mining venture by a multi-national corporation. The USOPIC is a United States government agency which provides risk insurance and financing for U. S. corporate investments abroad. Without the insurance and/or financing, the corporations proposing the gold mining venture decided to withdraw from the planned venture. However, the mining company is now suing the USOPIC for "leading them on", on the basis that OPIC first said it would fund the project and then withdrew the financial support once the U. N. passed the resolution.

Source: Environmental Defense Fund Letter, April 1997

Coral Reef Protection Subject Of House Resolution

Congressman George Miller (D-CA) has introduced House Resolution 87 which urges the United States and the United Nations to "condemn destructive coral reef fishing practices and to make every effort to promote sustainable use of coral reef resources." The resolution specifically cites a number of deleterious activities which have a negative impact on coral reefs including cyanide fishing, use of explosives for tropical fish collection, and mining.

A resolution differs from a congressional bill in that it does not become "law" but merely serves to raise awareness among the members of Congress and the general public about a particular issue.

Source: Living Oceans News, a publication of the National Audubon Society, Spring 1997

National Animal Damage Control Committee Established

The U. S. Department of Agriculture (USDA) has appointed a number of new members to the National Animal Damage Control Advisory Committee. The purpose of the Committee is to advise the USDA on policies and programs necessary to control damage caused by depredating wildlife. The USDA states that the program is designed to protect agriculture, natural resources, and public health and safety.

"The Committee provides the essential function of bringing together the various competing interests involved in controlling wildlife damage," said Bobby Acord, deputy administrator for animal damage control with the Animal and Plant Health Inspection Service (APHIS), a division of the USDA.

Recent issues considered by the Committee include changing practices in livestock and crop production and the impact of depredating animals, the importance of wildlife conservation, public health problems created by wildlife, and research needed to improve control methods. Individuals appointed to the Committee serve a two-year term and are supposed to represent wildlife conservation, public health, academic, animal welfare and agriculture concerns.

Source: APHIS News Release 20 May 1997

Canadian Lynx Proposed For ESA Listing

Following a 12-month comment and investigation period, the Fish and Wildlife Service (USFWS) has announced that listing of the United States population of the Canada lynx (*Lynx canadensis*) under the Endangered Species Act is warranted but precluded by other higher priority actions. This decision was based, in part, on the fact that sufficient populations of the species exist outside the contiguous 48 states, primarily within Canada.

The report issued by the USFWS concerning the decision to decline listing stated: "In a general sense, Canada lynx in the contiguous United States might be considered biologically and/or ecologically significant simply because they represent the southern extent of the species' overall range. There are climatic and vegetational differences between Canada lynx habitat in the contiguous United States and that in northern latitudes in Canada. In the contiguous United States, Canada lynx inhabit transition zones that are a mosaic between boreal/coniferous forest and northern hardwoods, whereas in more northern latitudes, Canada lynx habitat is the boreal forest ecosystem."

The Canada lynx preys primarily on the snowshoe hare, and the population dynamics in the contiguous United States are different from those in northern Canada. Historically, Canada lynx and snowshoe hare populations have been less cyclic in the contiguous United States, not exhibiting the extreme cyclic population fluctuations of the northern latitudes for which Canada lynx are noted. "The less cyclic nature of this population has been attributed to the lower quality and quantity of habitat available in southern latitudes and/or the presence of additional snowshoe hare predators. The Service determines that the contiguous United States population of the Canada lynx is significant under the Service's Distinct Vertebrate Population Policy. Thus, the Canada lynx in the contiguous United States qualifies as a distinct population segment to be considered for listing under the Act."

The decision not to list the Canada lynx was made based on listing priority guidelines first issued in 1983. The guidelines describe a system for considering three factors in assigning a species a numerical listing priority on a scale of 1 to 12. The three factors are magnitude of threat (high or moderate to low), immediacy of threat (imminent or nonimminent), and taxonomic distinctiveness (monotypic genus, species, or subspecies/population). For a population, such as the Canada lynx, listing priority numbers of 3, 6, 9, or 12 are possible.

The USFWS stated in its report that it believes that several limiting factors pose threats to the continued existence of Canada lynx in the contiguous United States, including: "(1) Habitat loss and/or modification (due to human alteration primarily through timber harvest, road construction, and fire suppression); (2) over utilization from past commercial harvest (trapping) that has resulted in extremely low populations that remain subject to incidental capture from legal trapping of other furbearers; (3) inadequate regulatory mechanisms to protect the remaining lynx habitat; and, (4) other factors such as increased human access into suitable habitat (refugia) and human-induced changes in interspecific competition."

While the overall threat to the small population of the species in the United States is high, a listing priority of just 3 can be justified. Since numerous other species with much higher priority numbers are awaiting listing, the USFWS feels it is not justified in proceeding with a listing for the Canada lynx at this time.

Source: Federal Register: 27 May 1997, Volume 62, Number 101

Animal Behavioral Enrichment and Public Perception:
An Opportunity to Inform and Educate

By
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Some time ago Robert Yerkes (1925) in his observations of captive primates noted that the animals benefited in some way from what he described as exercise, play and entertainment. While Newberry (1995) aptly recognizes that the concept of enrichment for animals has yet to be clearly delineated and scientifically defined, enrichment practices are nonetheless occurring in many zoological parks and gardens as it evolves into a scientifically-based animal management discipline. Informed captive animal managers today do not subscribe to the concept of animal behavioral enrichment as simply exercise, play or entertainment, but rather as the provision of materials and activities in an effort to provide and promote a more healthy captive environment. The goal of behavioral enrichment is to enhance the physical and psychological well-being of captive animals.

Perhaps one facet of animal enrichment that is not often enough capitalized upon is the interpretive and educational opportunity enrichment programs can provide. In addition to providing direct benefits to captive animals, enrichment can serve as an effective tool to inform and educate the public about animal behavior and the role behavior can play in the *ex situ* conservation efforts of the zoo. Animal enrichment activities designed to stimulate behaviors that simulate natural behaviors an animal exhibits in the wild can help achieve some of the wildlife conservation goals of the zoo. Public education is without question an important facet of successful wildlife conservation and helps bring about important public support and participation (Jacobson & Padua, 1995). Ideally, expanding public appreciation for wildlife increases support for both *in situ* and *ex situ* wildlife conservation.

The benefits of animal behavioral enrichment should be multifaceted. One direct benefit is the improved health and welfare of the captive individual animals which may lead to better reproductive success. Such success improves chances of survival of the species by maintaining genetic diversity, and perhaps providing a pool of animals for reintroduction into the wild where and when appropriate. Another facet of behavioral enrichment is to enhance public appreciation and support for wildlife conservation that benefits the public and, in turn, is beneficial to all wildlife. Wildlife conservation is ultimately the principle mission for most zoological parks, gardens, bioparks, wildlife conservation parks and related facilities. If this multifaceted approach is taken to animal behavioral enrichment then it behooves those engaged in developing and implementing animal enrichment programs to keep in mind the important educational facet of the program.

As Robinson (1995) points out, care must be taken in what messages are conveyed to the public in zoo exhibits.in this case regarding animal enrichment. If enrichment activities take place in public view it is imperative that careful explanation and interpretation be provided. If not, a well-intentioned enrichment activity may convey

unintentional and perhaps detrimental messages to visitors. For example, I have observed at least a few instances (at a number of different zoos) in which animal enrichment has had a negative affect on the public educational values of animal exhibits simply because there was no explanation provided. In a case where cardboard tubes were used in an exhibit in view of the public with no explanation, I observed visitors commenting that there was "junk" in the exhibit and the animals were not being cared for properly, or "these animals must eat cardboard". Worse yet, I have heard young visitors comment "let me throw in my cup for the animal to play with" since the keeper was observed offering similar materials or "toys" to the animal. At best what is missed in such instances is the opportunity to educate visitors about an aspect of animal behavior, captive animal management, and the goals of a conservation establishment to promote the health and welfare of animals in captivity and by extension, the conservation of wildlife in their natural habitats. Interpreting to the public about the importance and purpose of animal enrichment conveys a caring message by zoo staff for the animals and can enhance visitor understanding of the important efforts by zoo staff to make the visitor experience more meaningful. It also provides a chance to impart the big picture of *ex situ* wildlife conservation.

Zoological facilities whose mission is wildlife conservation can only be successful with informed public support. The public generates a powerful and persuasive base that can be either beneficial or detrimental to the animal resources of a zoo and to overall wildlife conservation. Through education, the public can be enlisted as allies. The visitor who knows the importance of animal diets will not throw food and other foreign matter into animal exhibits. The visitor who understands the purpose of animal behavioral enrichment will recognize and begin to understand animal behavior and the necessity for animal inactive periods; the visitor who learns about animal behavior in captivity and how it relates to its wild habitat will support decisions made about animals in the zoo environment and help support animal conservation in the wild.

Perhaps the quote of the Senagalese ecologist Baba Dioum is becoming over-quoted, but the message is still profound in its truth..."In the end, we will conserve only what we love; we will love only what we understand; and we will understand only what we are taught." Animal behavioral enrichment programs provide an opportunity to educate the public about animal behavior and management and about the conservation efforts of zoological facilities. Ultimately, wildlife conservation can only be served by careful and comprehensive planning and implementation of animal behavioral enrichment programs.

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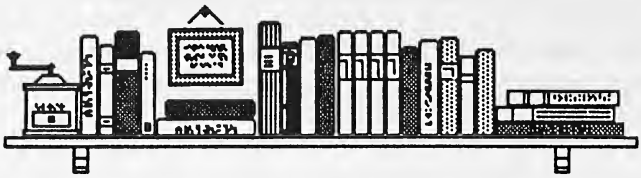

Book Review

Animals...Our Return to Wholeness
by Penelope Smith, 1993
Gilliland Printing, Inc.
127 N. Summit, Arkansas City, KS 67005-2281
355 pgs. Paperback Price: $19.95

Review by Tony Moore,
Graduate Biology Student
University of Maryland

Penelope Smiths' view of the earth and all of its inhabitants should be contagious to everyone, the world would be a much better place to live. In this book, she attempts to convey her feelings of being just another living creature on the planet rather than a "higher" being. By using stories of animal encounters and of counseling sessions with pet owners and pets, she attempts to teach the reader how to communicate with animals on a level not many people are accustomed to.

However good Ms. Smiths's intentions, even while trying to maintain an open mind, this book was very hard to review due to the main context being about the highly controversial subject of telepathy. In a world in which human to human telepathy is looked at skeptically, telepathy between humans and animals, plants, and even rocks and stuffed animals seems remarkable not to just those in the animal care field but to the vast majority of the public. Further adding to any skepticism one may have of Mrs. Smith's work is her claim of the ability to communicate with beings in the "spirit" realm. Through her communications, Smith has been able to ascertain what these individual spirits were in their past lives and what they will be in future lives.

If everyone in the zoo and aquarium community, or the world population in general, could communicate as Mrs. Smith does, all of our jobs would be much easier. Unfortunately, very few individuals claim to have Mrs. Smith's ability. Not having this ability can leave many questions unanswered to those who may read this book. Smith claims that humans have lost the ability to use telepathy through social conditioning. If this is so, regardless of conditioning, why would humans evolve the ability to communicate verbally if we could link by telepathy? Smith also relates her use of hand and verbal signals to train her canines. Why are these signals needed if she can tell them what to do telepathically?

Finally, adding more to the controversial nature of this book, is Mrs. Smith's claim that "Not all species evolved from one-celled microorganisms on earth; some arrived as complex animals." Her specific example are Afghan canines whose "...original group landed thousands of years ago in a spacecraft in Egypt,..." (p. 285). And in the final chapter we learn that Smith was a yeti (big foot) in a former life.

I find this book to be related to the zoo and aquarium field only through wishful thinking. While it would be wonderful if animals could "tell" us their thoughts and feelings, unfortunately, not many people have the ability to communicate this way.

Ecophysiology Of Desert Arthropods And Reptiles
By J.L. Cloudsley-Thompson
Springer-Verlag
Berlin, New York, Heidelberg
203pp. Hardback

Review By Diane Callaway, Supervisor
Wild Kingdom Pavilion
Omaha's Henry Doorly Zoo
Omaha, NE

J. L. Cloudsley-Thompson has focused this book on two of the most successful taxa of desert animals, Arthropods and Reptiles. Various parameters of the desert environment are defined, then comparisons are made between arthropods and reptiles in each area. Numerous scientific references are used to support the author's statements throughout the readings.

The table of contents divides this book into seven main sections. Each section is then subdivided and numbered for easy reference.

The first section, The Deserts of the World and Their Faunas, encompasses the classification of deserts, precipitation and moisture, exposure, parallel evolution, convergence, energy flow, process-functioning, herbivores and detritivores, carnivores and omnivores, and field metabolic rates.

The second section, Avoidance of Environmental Extremes, touches on desert microclimates, circadian and seasonal locomotory rhythms and social behavior.

The third section, Thermal Regulation and Control, dives into behavioral thermoregulation, insect flight, moving between sunlight and shade, posture and orientation, thermal and heat tolerance, maxithermy, cold tolerance, metabolic effects, color and reflectivity, ultraviolet radiation, and the mechanism of heat death.

The fourth section, Water Balance and Nitrogenous Excretion, centers on evaporative and excretory water loss, transpiration from eggs, osmoregulation, behavioral regulation of water loss, water uptake, drinking and 'fog basking', uptake of soil moisture, and absorption of atmospheric moisture.

The fifth section, Seasonal Activity and Phenology, envelops temporary rain pools, flooding, diapause, aestivation and seasonal patterns of activity, and phenology of reproduction.

The sixth section, Adaptations for Burrowing in Sand, Avoidance of Enemies and Defense, describes burrowing, sand swimming and running, adaptive and cryptive coloration, mimicry, warning sounds and threat displays, defenses, urticating hairs, repellent chemicals, venoms, autonomy, flight, and sensory physiology.

The final section, Interspecific Relationships, Feeding Specializations and Species Diversity, explains food selection and consumption, inter- and intraspecific competition, feeding specializations, detection and capture of prey, foraging tactics of predators, species diversity and competition, distribution and abundance of species, interacting factors, partitioning of resources, body size and biomass, and interactions between animals and plants.

Although Ecophysiology of Desert Arthropods and Reptiles is not a "light reader", this book contains endless bits of information for a wide variety of desert arthropods and reptiles. The table of contents is precise, allowing one to find the exact paragraph in which the subject matter is written. This is certainly an excellent reference book to have on hand.

Secrets of the Nest: The Family Life of North American Birds
By Joan Dunning, Paperback 1996
Houghton Mifflin Co., 215 Park Ave. S., New York, NY 10003
198 pgs., illustrated $15.95

Review by Stacey Southard
Trainer, Wildlife Theater / School Assemblies
Marine World Africa USA, Vallejo, CA

Secrets offers a detailed look at the nesting habits of a select group of North American birds. It is organized into eight chapters based on different nest types. Within each chapter are several representatives of bird species using the different nests.

The introduction discusses how the author got involved in birds, Chapter One the "practicality" of laying and caring of eggs, and Chapter Two the evolution of different nesting habits. The following six chapters discuss the nests themselves. How the nest is built, how many eggs are laid, and how chicks are raised and fledged is included for each species.

Secrets is written by an author devoted to her subjects, and at times tends to be more anthropomorphic than scientific. But it is filled with interesting details and is a very easy and enjoyable read. It is important to remember that it offers only a select group of birds (the author's favorites), not all birds native to North America. In addition to the text, there are also drawings (done by the author), which add enjoyment to the reading. Overall, it is a book most likely to be enjoyed by the casual birder.

Live birds that are being smuggled into the U. S., Canada and a number of other countries are often confiscated by customs officials, fish and wildlife agents, or other governmental entities. I am looking for statistical information on how many birds are confiscated each year, particularly in the U. S., and what happens to them after they are seized. Some information from the USFWS indicates that, in the past, confiscated birds were offered to zoos. Do you have any birds at your zoo which came from a smuggling/confiscation situation? Do you have any contact with any governmental entity that confiscates smuggled birds? Any information or leads about contacts in this area would be greatly appreciated. Contact Georgann Johnston, AAZK Legislative Advisor at (800) 338-7348.

Institutions wishing to advertise employment opportunities are asked to send pertinent data by the ***10th of each month*** *to: Opportunity Knocks/AKF, 635 S.W. Gage Blvd., Topeka, KS 66606-2066. Please include closing date for positions available and when setting these dates keep in mind that because of bulk-mail, most readers do not receive the AKF until the middle of the month or later. There is no charge for this service and phone-in or fax listings of positions which become available close to deadline are accepted. Our phone is 1-800-242-4519 (U.S.); 1-800-468-1966 (Canada). Our FAX is (913) 273-1980.*

ANIMAL KEEPER...Lincoln Park Zoo seeks full-time animal keeper. Responsibilities include all aspects of daily animal care and maintenance. Particular emphasis on informal educational exchange with zoo guests as well as inter-departmental interaction. High School graduate or equivalent required, BA/BS preferred. Starting salary $23,000.00 plus comprehensive benefits. Send resumé **by 31 July 1997** to: Human Resources Department, Lincoln Park Zoo, AK 997, P. O. Box 14903, 2001 N. Clark, Chicago, IL 60614. Fax: (312) 742-2299; Website: http://lpzoo.com. No phone calls please. EOE/M/F/D/V.

BIRD KEEPER...requires one year of zoo experience working with a variety of exotic birds. A B.S. in Zoology or a related field is preferred. Must have excellent communication skills and a willingness to interact positively with the public. Competitive salary and benefits. Send resumé, references, and salary history **by 31 July 1997** to: Human Resources Manager, Memphis Zoo & Aquarium, 2000 Galloway Ave., Memphis, TN 38112. FAX: (901) 725-9305. EOE.

ON-CAMERA HOST...Walt Disney Attractions Television Productions is currently engaged in a national talent search for on-camera host talent for a national television show featuring animals. Candidates **must** possess the following qualities: 1)extensive experience working with, studying, and understanding both domestic and wild animals; confidence in handling and/or being with them; 2) a fondness for animals and an appreciation for their conservation in the wild; 3) age 18-30 years old; any ethnicity; male or female; with an enthusiastic, fun-loving personality (borderline wacky - that kids will find "cool") and a willingness to express it on demand in a professional production situation; 4) availability to work on a television production with diverse shooting schedule occurring intermittently for several weeks starting and ending in the next 2-9 months. Other desired qualities include; 1) acting or television experience or 2) improvisational acting experience. Please fax resumés and cover letters to (407) 828-4613 or e-mail them to: AnimalTV@AOL.com. Indicate on your cover sheet whether or not you have a headshot and/or demo reel available.

LEAD KEEPER/Rhinos...requires the minimum of an Associate's Degree (A.A.) or equivalent from two-year college or technical school; and three-five years experience in rhinoceros husbandry, particularly reproductive programs and calf management; ability to write articles for publication that conform to prescribed style and format; ability to effectively present information and produce clear and accurate written reports; ability to define problems, collect data, establish facts, and draw valid conclusions; and the ability to effectively work in a team-oriented environment. Duties will include supervising and participating in the daily activities of an active conservation program for the maintenance, reproduction and rearing of white and black rhinos, as well as other ungulate species; the scheduling and supervision of 2-3 keepers; providing guest tours as scheduled; and assisting in keeper performance evaluations. Occasional extended hours, flexible scheduling and weekend work are inherent to this position. A comprehensive benefits package is included, specific details are available following the receipt of a resumé appropriate to the position. Salary range: $25,000.00 to $35,000.00. To apply, or for further details, contact White Oak Conservation Center, 2823 Owens Rd., Yulee, FL 32097-2145; phone - (904) 225-3396; e-mail: stevesh@wo.gilman.com

ANIMAL CARE SPECIALIST/zookeeper...requires responsible, motivated person with some animal care experience. Duties include: feeding, cleaning, maintaining exhibits, record keeping and related activities for a varied collection. Salary $13,000.00/year plus benefits. Send resumé **by 1 August 1997** to: Liz Harmon, Curator, Great Plains Zoo, 805 S. Kiwanis Ave., Sioux Falls, SD 57104.

The following positions are available at the Staten Island Zoo, Staten Island, NY. For all positions mail letter/resumé to: Mark Rich, General Curator, Staten Island Zoo, 614 Broadway, Staten Island, NY 10310.

KEEPER/VETERINARY TECHNICIAN...animal keeper and veterinary technician duties. Maintain zoo hospital (pharmaceuticals, equipment, ARKS and medical records). Must be New York State licensed or eligible for licensing. Salary $24,413.00 with excellent benefits. **Position open starting 17 July 1997.**

REPTILE KEEPER...animal keeper for large indoor reptile/amphibian collection containing many venomous species. Also works part-time in large aquaria. Requires minimum of 64 college credits, driver's license, and experience. Salary $24,413.00 with excellent benefits. **Position open until filled**.

KEEPER INTERNS (2)...Under mentorship of the General Curator will work throughout the animal department, have directed readings/projects. Requires minimum of two years college. **Start immediately.** Salary $250.00/week plus optional health benefits. For one or two semesters.

The following positions are available at the Ellen Trout Zoo in Lufkin, TX. These are full-time positions with excellent benefits and with excellent opportunities for professional growth and development. Applicants for both positions must be able to perform the physical aspects of the jobs and pass a drug/alcohol screen and physical examination. A valid driver's license and a good driving record are required. Interested parties should contact: Personnel Director, City of Lufkin, P. O. Drawer 190, Lufkin, TX 75902-0190, or call (409) 633-0228 by 30 July 1997. EOE.

GENERAL CURATOR...responsible for the overall supervision of the animal collection and animal care staff. Will also be working on implementation of zoo master plan and animal collection development. Applicant should have considerable knowledge of zoo animals, animal husbandry, current trends in zoo management and development, exhibitry, conservation, techniques of construction, and State and Federal laws that pertain to zoological park operations. Applicant should have knowledge of supervisory techniques and the ability to communicate effectively. Must be able to work independently, use initiative in day-to-day work, and be able to lead, inspire and motivate subordinates. Requires Bachelor's Degree in Zoology, Biology, Wildlife Management or related field and three (3) years progressively responsible experience in an accredited zoo. Starting salary: $22,942.00.

REPTILE KEEPER...responsible for the day-to-day care of the zoo's diverse reptile and amphibian collection. Applicant should have good knowledge of amphibian and reptile husbandry and breeding, including venomous snakes and large crocodilians and be able to assist in collection development as it pertains to master plan implementation. Position requires a Bachelor's Degree in Zoology, Biology, Wildlife Management or related field and at least one (1) year of experience working with a diverse collection of reptiles. Starting rate: $7.83 per hour.

ZOO ATTENDANT I...must have one year in the custodial care of animals, birds and reptiles. Requires knowledge of habits and behaviors of zoo animals including the care and feeding of zoo animals, symptoms of animal illness, nutritional value of animal food and basic first aid. Awareness of zoo practices and procedures and safety regulations regarding the public and zoo facilities is desired. Must have the ability to work safely and effectively with dangerous or exotic animals, birds or reptiles. Approximate monthly salary $2005.00 to $2437.00 with benefits. For application/information please call San Joaquin Human Resources Division, 24 S. Hunter, Rm. 106, Stockton, CA 95202 at (209) 468-3370. **Applications** will be accepted **through 1 August 1997**. **Faxed resumés** will be accepted through **1 August 1997** at (209) 468-0508.

HEAD ZOO CARETAKER/Capron Park Zoo, Attleboro, MA...prefer Associates' Degree in animal-related field, supervisory experience and minimum of two years animal keeping experience. Four years animal keeping and some supervisory experience may be substituted for a degree. Must have working knowledge of zoo management practices. Responsible for participating in and supervision of animal husbandry, transportation, enrichment, grounds maintenance, exhibit design and construction. Applicant must have the ability to work independently and as a team member and interact with the public. Competitive salary and benefits. Application **deadline is 8 August1997**. Please send resumé to: City of Attleboro, Personnel Director, Government Center, 77 Park St., Attleboro, MA 02703.

The following positions are available at Lion Country Safari, Inc., 2003 Lion Country Safari Road, Loxahatchee, FL 33470-3976.

CURATOR...Lion Country Safari in West Palm Beach, FL is seeking a Curator. Successful applicant will be responsible for the health, welfare and security of a diverse collection of mammals, birds and reptiles. This includes maintenance, diets, veterinary assistance, capture/restraint, record keeping and exhibit design. He/she will supervise approximately 10 keepers. Must be a high school graduate with preference given to a university degree in Animal Sceinces. Five (5) years paid experience in a recognized zoological facility is desired with a minimum of two (2) years supervisory experience. Salary commensurate with education and experience and a full-benefits package is offered. Send resumé, salary requirements and three (3) work references to Cathy Toomey/ Personnel at the address listed above.

KEEPERS I, II & III...Lion Country Safari is forming a registry of qualified keepers for present and future consideration. Experienced personnel are required for Elephants/ Rhinoceros, Lions, Hoofstock, Birds and Reptile positions. All positions require a minimum high school diploma with preference given to those with a university degree in Animal Sciences. Minimum one (1) year paid experience in a recognized zoo is essential. Lion Country Safari offers an excellent training program and a full range of benefits. Salary commensurate with education and experience. Send resumé and two (2) work references to Cathy Tommey/Personnel at the address listed above.

Zoo Ave Wildlife Conservation Park is administered by the non-profit, private Nature Restoration Foundation. Located in La Garita de Alajuela, Costa Rica, we are a modern zoological garden with over 700 birds, 150 reptiles, over 70 primates and a dozen additional mammals. We function as an official rehabilitation center for injured and confiscated wildlife. Zoo Ave specializes in releasing captive-bred and rehabilitated native avifauna. In addition, we are rehabilitating habitat for wildlife within the park. Built in 1992, we are still growing rapidly with new exhibits. We are a small dedicated staff who live

and work on the 36-acre property. To apply for the following positions, send a letter of interest and a resumé to G. Suzanne Chacon, Scientific Officer, Zoo Ave, Dept. 280 Box 025216, Miami, FL 33102. Sexual orientation, race and age will not be discriminated against. Knowledge of the Spanish language or the willingness to learn is required. Work weeks are six days long. Three weeks paid vacation is offered after one year of employment. Housing is provided. Salary is paid in above-average Coata Rican wages and is dependent on experience.

LOOKING FOR COUPLE...to fill two positions. Only one person is required to have animal care experience. Both are entry level management positions. All phases of zoo management will be required including, but not limited to, environmental education, staff supervision, grounds maintenance, business management, administration and animal care management. The second position is a zookeeper. Any combination of education and experience in this area will be considered. A house with furnishings is provided.

KEEPER/RELEASE MONITOR...this required avian experience with a well-rounded animal care background. Animal rehabilitation experience preferred. Duties will include all facets of animal care and the daily work involved in running a zoo. Individual research is encouraged. Shared house with furnishings is provided.

We also have a three-month intern/volunteer program available. Please write to the address previously given for information and an application.

One of the easiest and most effective things Americans can do for birds is to purchase a Migratory Bird Conservation Stamp, commonly known as the "Duck Stamp," available for $15 from post offices and national wildlife refuges around the country. Ninety-eight cents of every dollar raised by Duck Stamp sales is used to buy wetland habitat, which benefits migratory waterfowl and a host of other species of birds and wildlife.

AAZK Membership Application

check here if renewal [ ]

Name _____

Address _____

City _____ **State/Province** _____ **Zip** _____

U.S. Members

☐ **$35.00 Professional**
Full-time Keepers

☐ **$30.00 Affiliate**
Other staff & volunteers

☐ **$30.00 Associate**
Those not connected with an animal facility

☐ **$60.00 or up** - *Individuals*
Contributing/U.S.

☐ **$100.00 or up**
Institutional/U.S.
Organizations / Institutions (requires Board approval)

☐ **International Members**
$50.00 International
All members outside U.S. & Canada regardless of category

Canadian Members

☐ **$40.00 Professional**
Full-time Keepers

☐ **$35.00 Affiliate**
Other staff & volunteers

☐ **$35.00 Associate**
Those not connected with an animal facility

☐ **$60 or up** - *Individuals*
Contributing/Canada

☐ **$100.00 or up**
Institutional/Canada
Organizations / Institutions (requires Board approval)

☐ **Library Only**
35.00 Library
Available only to public & university libraries

Zoo Affiliation (if any) _____

Zoo Address _____

Title _____

Work Area _____

☐ **My check is enclosed (AAZK, Inc.)** ☐ **Please charge my credit card**

MASTERCARD ___ **VISA** ___ **Card #** _____ - _____ - _____ - _____

Name on card _____ **Expiration date** _____

Signature _____

Mail this application to: AAZK Administrative Offices, Topeka Zoo, 635 S. W. Gage Blvd., Topeka, KS 66606-2066. Make checks/money orders payable to AAZK, Inc. Must be in U.S. FUNDS ONLY. Membership includes a subscription to *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada.

American Association
of Zoo Keepers, Inc.
635 S.W. Gage Blvd.
Topeka, KS 66606-2066
U.S.A.

Address Correction Requested

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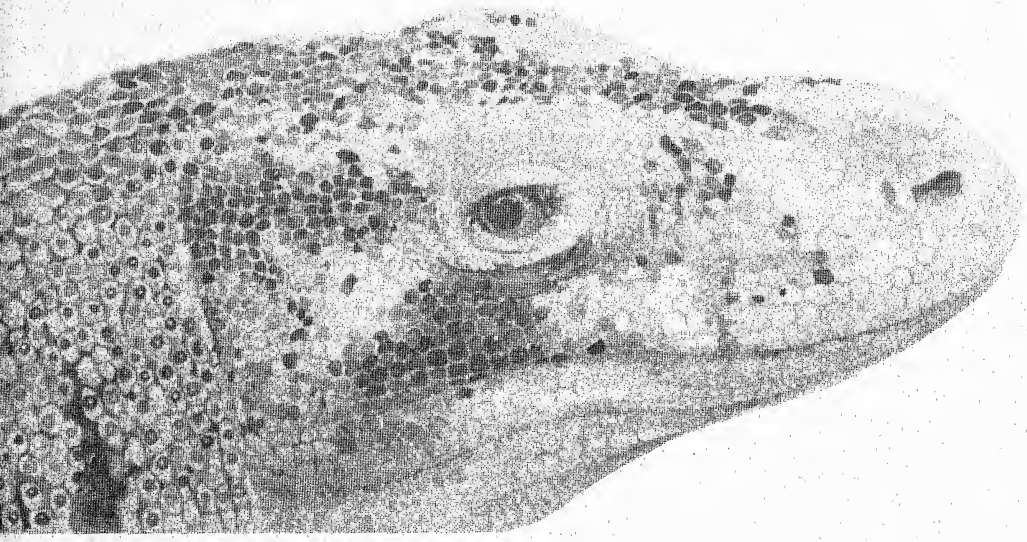

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AUGUST 1997

ANIMAL KEEPERS' FORUM, 635 S.W. Gage Blvd., Topeka, KS 66606-2066
Phone: 1-800-242-4519 (U.S.) 1-800-468-1966 (Canada) FAX 913-273-1980

AUGUST 1997
Vol. 24, No. 8

Managing Editor: Susan D. Chan • **Associate Editors/Enrichment Options Coordinators:** Kayla Grams, Arizona-Sonora Desert Museum & Gretchen Ziegler, Sequoia Park Zoo • **Book Review Coordinator:** Andrea Bernee, Chaffee Zoological Garden • **Legislative Outlook Column Coordinator:** Georgann B. Johnston, Sacramento, CA. • **ABC's Column Coordinator:** Diana Guerrero, San Diego, CA • **Reactions Column Coordinator:** William K. Baker, Jr., Lufkin, TX

Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, Inc. Ten dollars of each membership fee goes toward the annual publication costs of Animal Keepers' Forum . Third Class postage paid at Topeka, KS. Postmaster - Please send address changes to: **American Association of Zoo Keepers, Inc., Administrative Offices, 635 S.W. Gage Blvd., Topeka, KS 66606-2066 - attn: Barbara Manspeaker, Administrative Secretary**

AAZK Executive Director: Ed Hansen, AAZK, Inc., Topeka KS

Table of Contents

About the Cover.....

This month's cover features the Komodo Dragon (Varanus komodoensis) drawn by Bill Tuttle, Supervisor of Graphics & Design at Miami Metrozoo in Miami, FL. This is an exhibit illustration from Metrozoo's newest exhibit - The Falcon Batchelor Komodo Dragon Encounter which opened to the public in January of 1996. Komodo dragons are the largest living lizards and are found only on the Sunda Islands in Indonesia. They are endangered and considered a national treasure by the Indonesian government. Look for an article about this interesting species on page 353 of this issue. Thanks, Bill!

Information for Contributors

Animal Keepers' Forum publishes original papers and news items of interest to the animal keeping profession. Non-members are welcome to submit articles for consideration. Articles should be typed or hand-printed and double-spaced. Articles may be submitted on disk by arrangement with the Editor. All illustrations, graphs, charts and tables should be clearly marked, in final form and should fit in a page size **no greater than** 5.5" x 8.5" (14cm x 22cm). Literature used should be cited in the text (Brown, 1986) and alphabetically in the final bibliography. Avoid footnotes. Include scientific name (as per ISIS) the first time an animal name is used. Thereafter use common name. Use metric system for weights and measurements (standard equivalents may be noted in parenthesis). Use the continental dating system (day-month-year). Times should be listed as per the 24-hour clock (0800, 1630 hrs. etc.). Glossy finish black and white photos **only are accepted**. Color slides should be converted to black and white prints (minimum size 3" x 5" [8cm x 14cm]) before submission. Clearly marked captions should accompany photos. Please list photo credit on back of photo.

Articles sent to *Animal Keepers' Forum* will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for *AKF*. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed, appropriately-sized envelope. Telephone and FAX contributions of late-breaking news or last-minute insertions are accepted as space allows. However, long articles must be sent by U.S. mail. Phone 1-800-242-4519 (US); 1-800-468-1966 (Canada); FAX (913) 273-1980.

Deadline for each regular issue is the 10th of the preceding month. Dedicated issues may have separate deadline dates and will be noted by the editor.

Articles printed do not necessarily reflect the opinions of the *AKF* staff or the American Association of Zoo Keepers, Inc. Publication does not indicate endorsement by the Association.

Scoops & Scuttlebutt

Administrative Offices To Change Area Code

The area code for the Topeka, Kansas area is being changed from 913 to 785 effective immediately. This will not affect the 800 numbers into Administrative Offices, but it will affect the Fax line. Although a "grace period" during which the old area code will be accepted runs into next year, please note this change for your records. AAZK's Fax Line is now: (785) 273-1980.

Audubon Chapter Acknowledged for Donation

The Audubon Institute Chapter of AAZK, New Orleans, LA, has generously donated $1000.00 to AAZK's general operating fund. In a letter to AAZK President Ric Urban they noted that "Our local Chapter, of course, cannot exist without the Association. We all find the *Animal Keepers' Forum* to be an invaluable publication. Please accept this check for $1000.00 and continue the work you are doing for this Association of which we are all proud to be members."

The AAZK Board of Directors and the Administrative Office Staff sincerely thank the Audubon Institute Chapter for both their encouragement and support of the Association.

Rhino Management Workshop Planned for Houston

We are organizing a rhinoceros management workshop for the AAZK Conference in Houston. We invite all interested parties to participate. One of the primary goals will be to compile and share information on different management tools and techniques. If you plan on attending, please bring information on: gestation length, pregnancy determination, labor duration and behavior, birth weights, neonatal morphometrics and physical appearance, calf health problems, weaning, and behavioral conditioning. Any other topics of interest are welcome for discussion. For further details contact: John Piazza or Lisa Fitzgerald, Dallas Zoo, (214) 670-6833; Fax - (214) 670-6717 or via e-mail at dzconsrc@airmail.net.

Enrichment Committee Seeks Workshop Topics

The AAZK Enrichment Committee would like your ideas and suggestions for topics to be addressed at the Enrichment Workshop that will be held at the National AAZK Conference in Houston. The Committee will select several topics for an open forum discussion. Please contact any member of the Committee via mail, phone or fax prior to **30 September 1997** regarding your discussion topics. Members of the Committee are: Dianna Frisch, 7731 Whitneyway Dr., Worthington, OH 43085, (614) 785-9951, e-mail -djfrisch@aol.com; Kayla Grams, Arizona-Sonora Desert Museum, 2021 North Kinney Rd., Tucson, AZ 85743-

8918, (520)883-1380, fax (520) 883-2500; Gretchen Ziegler, Sequoia Park Zoo, 531 K St., Eureka, CA 95501, (707) 441-4229, fax (707) 441-4237; or Lee Houts, Sacramento Zoo, 3930 West Land Park Dr., Sacramento, CA 95822-1123, (916)264-5166, fax (916) 264-5887.

SFCC Animal Technology Alumni Reunion

The Santa Fe Community College Zoo Animal Technology Program and Teaching Zoo will be celebrating its 25th Anniversary October 17-19, 1997. As part of the weekend events, an Alumni Reunion is being planned for October 17th. Activities will include lunch, dedications and tours of our new $1.7 million facilities. If you are an Alumni of the program and are interested in attending the Reunion please contact us at: SFCC Zoo Animal Technology Program, Attn: Reunion Committee, 3000 N. W. 83rd St., Gainesville, FL 32606 or call (352) 395-5601 or e-mail at: jack.brown@santafe.cc.fl.us.

Keeper Participation Needed in Koala Field Research

Habitat is one of the most critical factors for the continued survival of the koala. Approximately 80% of the koala habitat has been destroyed. The current koala population is estimated by the Australian Koala Foundation to be between 40,000-80,000 animals, which is a far cry from the millions that once inhabited the eucalyptus forest of Eastern Australia. How can you help? By joining the Australian Koala Foundation and the Zoological Society of San Diego in their next joint field expedition from 11-27 October 1997 in the Pilliga area of New South Wales. Keeper participation in field research can be one of the most rewarding experiences! Interested representatives should contact Valerie Thompson, Associate Curator Of Mammals, San Diego Zoo, P. O. Box 551, San Diego, CA 92112-0551; (619) 685-3226; FAX - (619) 232-4117; e-mail: 102456.2745@compuserve.com.

Attention Runners! Rhino Group Heads for New York Marathon

Save the Rhino International is looking for a few good runners to join a "Rhino Group" to participate in the New York Marathon. If you are interested you may reach Julie Roach or Johnny Roberts at: Save the Rhino International, Winchester Wharf, Clink St., London SE1 9DG, England; Phone: 44 (0) 171-357-7474; Fax: (44 (0) 171-357-9666; e-mail: save@rhinos.demon.co.uk; Internet: http://www.cm.net.com/rhino/

Travel Information Available for Houston Conference

Continental Airlines will be handling travel arrangements for the 1997 AAZK National Conference. If you would like more information, please contact Susan or Barbara at AAZK Administrative Offices at 1-800-242-4519 (U.S.) or 1-800-468-1966 (Canada).

Message from the President

Greetings from the Lone Star State!

In this issue the AAZK membership has the opportunity to review the proposed Five-Year Long-Range Plan developed by the Board of Directors. Over the past months, the Board has been taking responses from Chapters and disseminating important information to the membership. Chapters received a copy of the Plan in July. Now, the Board of Directors and I want to know what you think.

Please keep this in mind while you read it - This Long-Range Plan is a guideline to give a group direction and goals. It is not Set in Stone, things can be changed for the benefit of the Association. It is our intention that there will be an annual review of the Long-Range Plan, and there will probably be revisions from time to time. As we all know, masterplans get revised all the time, but at least AAZK will now have a Long-Range Plan. It will continue to be a work in progress as the Association's needs and programs evolve.

Delegates attending the National Conference in Houston will be asked to ratify this plan at the General Meeting on Thursday, 9 October. If you will not be attending the Conference, we still want to have your input, suggestions, concerns, etc. about the Long-Range Plan. This is the future of your professional organization. Please call, fax or use my e-mail address (RicUrban@aol.com) and let me know what you think.

The 1997 AAZK National Conference is just around the corner. Remember, Texas is not just a State, It is an Attitude.

See you in Houston,

Ric Urban, AAZK President

The American Association of Zoo Keepers, Inc

Long Term Action Plan

1997 - 2002

Mission Statement

To provide a resource and a forum of continuing education for the animal care professional and tosupport zoo and aquarium personnel in their roles as animal care givers, scientific researchers, public educators and conservationists. To promote zoos and aquariums as cultural establishments dedicated to the enrichment of human and natural resources; to foster the exchange of research materials, enrichment options and husbandry information through publications and conferences which will lead to a greater understanding of the needs and requirements of all animals.

I. Education

A. Professional Development / Growth - Provide opportunities for the continuing professional development of the animal care professional.

1. Continue to endorse formal and organized assemblies for the purpose of dialogue and information exchange.

a. National and Regional Conferences
b. Workshops and Symposiums

2. Endorse combined conferences and meetings with other organizations that are related to the zoo keeping field for continued education, (i.e. AZA, CAZPA, ALPZA, EMA, ZRA, IMATA, AZH, and AZAD).

3. Continue to promote and encourage research which leads to a greater understanding of the needs and requirements of animals held in captive situations.

a. AAZK Zoo Keeper Grant in Research.
b. Develop a program/workshop to train animal care professionals in research design, analysis and transcription.

B. Educational Materials - Develop, produce and distribute educational materials of technical, scientific, practical or informational content or substance, including but no limited to the following: Animal Keepers' Forum, Junior Keepers' Forum, Animal Data Transfer Forms, Zoonotic Diseases, Biological Values for Selected Mammals, Crisis Management Resource Notebook, Incubation Reference Manual, Fishes and Marine Invertebrate Diet Notebook, Zoo Infant Development Notebook, and Annual Conference Proceedings.

C. Public Education - Promote public education on the topics of zoos, aquariums, wildlife reserves and related animal care facilities through public education programs and publications dealing with these topics.

1. Maintain the AAZK, Inc Home Page on the Internet.
2. Distribute educational materials.
3. Promote career path education.
4. Continue to offer the Junior Keepers' Forum.

II. Conservation

A. Support and publicize AAZK's concern for all valid and deserving projects of conservation and emphasize, through public education programs, the need for worthwhile projects of preserving our natural resources and animal life.

B. Encourage and foster zoo keeper participation in conservation projects and programs.

1. Continue to offer the Conservation, Preservation and Restoration Grant.
2. Continue to foster the Earthwatch partnership.
3. Support institutional sponsored projects.

C. Support Zoo and Chapter Conservation directed towards projects and initiatives which increase knowledge of captive husbandry and contribute to the propagation, welfare and longevity of individual species.

1. Support species survival in the wild through conservation efforts *in situ* and *ex situ*.
2. Support management and breeding programs of wild populations through methods developed by national and international authorities.

D. Encourage keeper participation in zoological communities and exchange information learned with colleagues. Participation includes but is not limited to Species Survival Plans, Population Habitat Viability Assessment Workshops, Studbooks, Taxon Advisory Groups and Fauna Interest Groups.

E. Continue the Bowling for Rhinos Program and encourage membership participation and support. Provide the membership with the most current information on the reserves supported by the BFR Program; Lewa Wildlife Conservancy (Africa), Ujung Kulon (Java), and Bukit Barisan Seletan National Park (Sumatra).

F. Continue to endorse and support the Center for Ecosystem Survival, the Conservation Parking Meters and the Adopt An Acre Programs. Encourage Chapter and Zoological support.

III. Finances

A. Research alternate financial support in order to keep membership dues at an affordable level.

1. Investigate Grants
2. Increase advertising revenue

B. Solicit Chapter Financial Support to insure the Association's ability to achieve its goals and programs.

C. Seek corporate sponsorship for AAZK, Inc., publications and projects.

D. Establish endowment funds to insure the long term survival of the Association and its programs. General Operations fund, minimum $100K; Conservation, Preservation and Restoration Grants, minimum $20K; and Research Grants, minimum $20K.

1. Implore corporate sponsorship
2. Initiate a campaign to solicit Chapters to pledge a percentage of annual revenues or a specific dollar amount.
3. Encourage bequests
4. Campaign for membership support with the option to give individually with their membership renewal.

IV The AAZK Image

A. Heighten AAZK, Inc.'s image at the membership/ Chapter level by increasing the following:

1. Educational opportunities
2. Peer communication
3. Research support and exchange
4. Enrichment options and husbandry information
5. Conservation efforts and opportunities
6. Professional growth
7. Opportunities for participation in AAZK, Inc.'s Committees

B. Heighten AAZK, Inc.'s image in the zoological community, among institutions and other related organizations.

1. Appoint Liaisons
2. Participate in exchange of publications between related organizations
3. Develop conservation partnerships with related organizations and zoological institutions.
4. Promote institutional support of staff members in continuing education and professional development.

C. Increase the awareness of AAZK, Inc. in the Community at Large.

1. Continue to participate in projects that promote conservation awareness, (i.e. Bowling for Rhinos, Conservation Parking Meter and Adopt An Acre Programs).

2. Promote educational opportunities for children through the Junior Keepers'Forum, Adopt a School and Mentoring Programs, interaction with organizations such as Boy Scouts and Girl Scouts, 4-H Clubs, etc., and speaking at local schools about career opportunities and the zoo keeping field, in general.
3. Encourage Chapters to promote AAZK during special zoo events.
4. Promote educational opportunities for the public concerning the different aspects of the field of zoo keeping (i.e. nutrition, husbandry, research, enrichment, medicine, conservation program involvement, etc.).
5. Continue to increase membership in AAZK, Inc. by soliciting institutions, new employees, support personnel and members in related organizations.

Funding Assistance Available for AZA Professional Training Schools

To encourage attendance at the professional training schools, the AZA Board of Regents makes several awards available to aquarium and zoo professionals. **Zoo school candidates from your organization should be applying for these awards.** Whether your organization is large or small, has a tight or generous budget, or is sending one student or 10, these cash awards and tuition scholarships can make a difference. To be eligible to apply for any of the following awards you must be an AZA member and be employed full-time in a zoo or aquarium. For application information, please contact the AZA Office of Membership Services at (304) 242-2160.

Available Awards:

Robert O. Wagner Professional Development Award - To encourage the development of zoo professionals, this award may be applied toward any AZA school. Tuition, accommodations, transportation, meals and a $200 stipend are provided to the recipient.

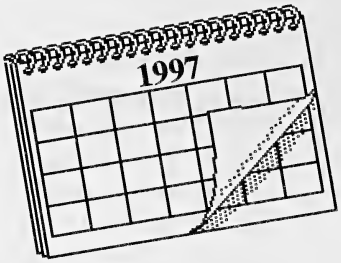
International Conservation Training Award - To promote professional training for our foreign zoological colleagues, this award goes to individuals who are currently involved in cooperative efforts with AZA member institutions, TAGs, FIGs or SSPs. Tuition, accommodations, transportation and meals are provided for the recipient to attend any AZA school.

Diversity Advancement Award - To support participation in the AZA schools by ethnic minorities, a $500 award may be given to qualified applicant.

Dinamation's Applied Biology School Award - To support students committed to improving their knowledge of applied biology, a $500 cash award may be given to a qualified applicant for this school.

Margaret A. Dankworth Management School Scholarship - Limited to those participants in the second year of Management School, this award provides full tuition, accommodations and a $500 stipend for the recipient. (Applications are currently being accepted for the 1999 school for this award.)

Coming Events



AZA Annual Conference - September 14-18, 1997 - Albuquerque, NM. For further information contact Terry Axline, Albuquerque Biological Park, 903 Tenth St., S.W., Albuquerque, NM 87102 (505) 764-6200.

Annual Conference of the Association of Zoological Horticulture - September 25-October 1, 1997. For further information contact Gary Outenreach, Horticulture Exhibit Manager, Moody Gardens, 1 Hope Blvd., Galveston, TX 77554 (800) 582-4673, ext. 271.

Association of Zoo Veterinary Technicians - September 27-October 2, 1997, Asheboro, NC. Hosted by the North Carolina Zoological Park. For conference or membership information contact: Jenni Jenkins, LVT, AZVT Secretary, National Aquarium in Baltimore, Pier 3, 501 E. Pratt St., Baltimore, MD 21202, (410) 659-4256.

AAZK National Conference - October 5-9, 1997 in Houston, TX. Watch the *Forum* for information or contact Christine Smith or Ric Urban at the Houston Zoo, 1513 North MacGregor, Houston, TX 77030; (713) 520-3200.

Third International Conference on Environmental Enrichment - October 12-17, 1997 in Orlando, FL. For further information contact Thad Lacinak, Sea World, Inc., 7007 Sea World Dr., Orlando, FL 32821 (407) 363-2651.

13th Annual Midwest Herpetological Symposium - October 17-21, 1997 at Shakopee, MN. Hosted by The Minnesota Herpetological Society. For further information contact Bill Moss (^12) 488-1383 or Liz Bosman (612) 476-0306 or e-mail MNHAAAERPSOC@AOL.COM

American Association of Zoo Veterinarians Annual Conference - October 26-30, 1997 in Houston, TX at the Sheraton Astrodome. For conference information contact: Wilbur Armand, VMD, Executive Director/AAZV,6 North Pennell Rd., Media, PA 19063; Phone (610) 358-9530; Fax (610) 892-4813.

The 25th Annual Conference of the International Marine Animal Trainers Association - October 26-31, 1997 in Baltimore, MD. Hosted by the National Aquarium in Baltimore. For further information, contact Tim Sullivan, Brookfield Zoo, Seven Seas, 3300 Golf Road, Brookfield, IL 60513; (708) 485-0263, ext. 464, fax: (708) 485-3532; e-mail: tsulli@manta.nosc.mil.

18th Annual Elephant Managers Association Workshop - November 1-4, 1997 in Fort Worth, TX. For further information contact Steve Clarke, Fort Worth Zoo, 1989 Colonial Parkway, Fort Worth, TX 76110; phone (817) 871-7415; fax (817) 871-7012.

ChimpanZoo Annual Conference - November 15-19, 1997 in Little Rock, AR. For further information contact Mark Hartmann, Ph.D., Dept. of Sociology-Anthropology, University of Arkansas, 2801 So. University Ave., Little Rock, AR 72204; phone (501) 569-3176; or e-mail MAHARTMANN@UALA.EDU

New Professional Members

Julie Miner, **D.E.W. Animal Kingdom (ME)**; Lisa Laskoski, no facility listed, **W. Haven (CT)**; Ruth E. Keck, **Cape May Co. Park Zoo (NJ)**; Lisa Green, **Prospect Park Wildlife Conservation Center (NY)**; Kendall B. Rausch, **Bronx Zoo (NY)**; Jen Savage, **Philadelphia Zoo (PA)**; Barbara Anderson, **Chehaw Wild Animal Park (GA)**; Susan Hilton, **Santa Fe Community College Teaching Zoo (FL)**; Renee Irvine, Private Primate Sanctuary **(FL)**; Scott C. Lincoln, **Miami Metro Zoo (FL)**; Angel Triano, Tania Pitts, Janice Hudson, Jason Hedegard, Dana R. Bachard, Jennifer Robertson and Jeff Davidson, **Lion Country Safari (FL)**; Victoria Cool-Hines and Lisa Trusty, **Louisville Zoo (KY)**; Bridget Davis, Elizabeth Rose and Kerry Lee Mahan, **Fort Worth Zoo (TX)**; Angela R. DeNeen, **Dallas Zoo (TX)**; Allan Seidon, **El Paso Zoo (TX)**; Anne E. Holmes, **Sea World of California (CA)**; Chris Alaimo, **Chaffee Zoological Gardens of Fresno (CA)**; and Elizabeth Burkell-King, **Honolulu Zoo (HI)**.

New Institutional Members

Lake Superior Zoological Gardens, Duluth, MN

Kansas City Zoological Gardens, Kansas City, MO

Renewing Contributing Members

John Seyjagat, Director
The Lubee Foundation, Gainesville, FL

Vernon N. Kisling, Jr., High Springs, FL

Marilyn R. Lemrow, Spring Valley, CA

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FAX: (785) 273-1980
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Topeka, KS 66606-2066
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Administrative Office Staff

Barbara Manspeaker - Administrative Secretary
Susan Chan - Managing Editor AKF
Orca - Office Cat

Office Hours: 9:00 a.m. - 3:00 p.m. CDT

REACTIONS

A Question and Answer Forum for the Zoo Professional on Crisis Management

By William K. Baker, Jr., Zoologist
Lufkin, TX

QUESTION
What precautions can Zoo Keepers take to make their daily work environment safer?

COMMENTS
Zoo Keepers are typically required to work 365 days a year, in all weather conditions, and in close proximity to exotic animals. This is all part of the job description for the zoological professional. However, performing these duties in an unsafe work environment is not part of the job description. Granted, there is a certain risk factor associated with managing exotic animals in captivity, but that doesn't excuse unsafe working conditions for animal managers. Safety in a zoological institution is the dual responsibility of the Zoo Keepers and the Zoo Managers. This requires effective two-way communication to ascertain the specific needs of the staff and institution. Still, there are some basic guidelines for the Zoo Keepers "down in the trenches" who are trying to get through the workday.

GENERAL SAFETY

1. Dress appropriately for the prevailing weather conditions and the specific tasks that are required in your work area. Gloves and good footwear are always second thoughts until the need for repairs, running, or climbing occurs.

2. Always insure that the proper tools are available and adequate to the task. Tools should be maintained and repaired as needed. This is applicable to both hand and power tools used in the keeper environment.

3. Keep all keeper work areas free of debris, trash, and "unfinished projects". Not only is it a fire hazard, it's underfoot, and someone is always tripping over it. Keep corridors, doorways, and shift areas clear at all times.

4. Radios and telephones should be kept in good working condition at all times. Extra batteries or charged radios should be located in each major work area. Radios should be carried at all times and kept "on", especially when working alone.

5. First aid equipment, fire extinguishers, smoke detectors, and emergency lighting should be located in every keeper work area. Training in first aid and CPR should be pursued whenever possible. MSDS sheets should be available on the chemicals used in the work area and reviewed in advance.

PERSONAL SAFETY

1. Always ensure that you are physically prepared for the workday. Staying physically fit, getting regular sleep, and eating a proper diet is more than good health, it's good sense.

2. Stay focused during the workday. Leave your personal life at home and try to reduce stress whenever possible. Thinking about the latest argument at home and shifting animals are incompatible behaviors.

3. Maintain a positive attitude. If you're convinced that the day is going to be pure misery, it will probably be just that. Also, remember, captive animals tend to be sensitive to their environment, keeper activity, and associated moods.

5. Be careful when using over the counter medications. A large number of antihistamines tend to cause drowsiness. If you're taking prescription medications, be aware of possible side-effects and drug interaction warnings.

6. Never pick up a dart used in an animal sedation with an ungloved hand. Many of the pharmaceuticals used by zoo veterinarians are toxic to humans (i.e. Etorphine (M-99) and carphentanol). Exercise caution when handling narcotics.

ANIMAL SAFETY

1. Know the medical history, personal history, and personalities of the animals in your care. This would include a working knowledge of the established hierarchies in family groups, colonies, and herds.

2. Always read the daily report for your section or work area, especially when returning from the weekend or a vacation. This is the best way to find out what is happening on a daily basis with the animals, projects and staff.

3. Always monitor exotic animals for changes in behavior. A change in established behavior patterns could be due to environmental stress or physiological problems. Either way, the animal is stressed and extra care should be taken.

4. Always know where your animals are. This applies especially to shift

procedures for dangerous animals. If the count is unsure or visual contact is lost, start over. Once the shift is complete, check doors, locks, and do another head count. Try to eliminate "blind spots" if possible.

5. Be aware of the risk of zoonotic diseases. Always use gloves and mask if there is a reason to suspect bacterial or viral contamination. Wash hands and disinfect equipment regularly. Also, be familiar with CDC and NIH guidelines.

EXHIBIT SAFETY

1. Always lock security chains, gates, and doors that control access to keeper work areas. This should be done every time someone enters or leaves an area. This keeps the public out and provides another layer of animal containment.

2. Check locks on exhibits and holdovers before leaving an area, and check locks when returning to an area. A good example of this type of situation would be when staff members leave zoo grounds for lunch and return for afternoon duties.

3. Inspect locks, shift doors, throw bars, pulleys, and ropes on a regular basis. Periodic preventative maintenance will catch most mechanical problems before they become safety concerns.

4. Inspect exhibits, enclosures, and holdovers on a daily basis. This would include walking fence lines, checking hot wires, looking for loose boards, inspecting weld points, and watching for erosion that may provide escape routes.

5. Double-check everything and assume nothing. If something in the exhibit or holding area looks unsafe, stop, step back, and take a second look. There is nothing wrong with relying on intuition if something doesn't "feel right".

If you would like to submit a question for this column or have comments on previously published material, please send them to: Reactions/AKF, 635 S. W. Gage Blvd., Topeka, KS 66606-2066.

(About the author: Since 1985 Bill has been active in the fields of science, zoology and wildlife management. His education and experience include a B.S. in wildlife management and post-graduate studies in zoology, Lab and Museum Assistant, Shoot Team leader, ERT Member, Senior Keeper and Large Mammal Keeper at various AZA facilities. His area of research is crisis management in zoological institutions, which draws upon practical experience and training as a Rescue Diver, Hunter Safety Instructor, NRA Firearms Instructor, and Red Cross CPR/First Aid Instructor.)

Oral Medications: Amounts & Effectiveness, Literary Search

By
Mike Williamson (Intern Project, The Florida Aquarium)
Thomas M. Fenske (Biologist, The Florida Aquarium)
Tampa, FL

Anyone who has observed marine fishes in an aquarium setting, either from working with them or owning them as a hobby, can appreciate the importance of treating fish diseases. Unfortunately, there has been little research so far to determine the effectiveness of oral medications on fish, an approach that could prove to be more efficient and precise than traditional soaking methods. Some data exists on certain drugs for specific infections. This can be useful, but a lack of unifying principles in the general treatment for fish makes application of this available data only marginally helpful.

Oral administration of drugs to fish specimens is a highly effective way of treating bacterial infection and parasitic infestations. This paper is an accumulation of past and present oral medications, dosages and effectiveness.

There are a couple of tables here that can be referred to for specific remedies for some of the more common fish diseases, particularly those caused by bacterial or parasitic infections. Table 1 gives the recommended dosages for a certain drug, and Table 2 lists conditions or uses for that drug.

For example, Table 2 indicates that there are several possible drugs to treat *Aeromonas sp.* a bacterial infection. A glance at Table 1 would yield the exact amount of a particular drug to be administered, for instance, 1g of Kanamycin® mixed in per 1kg. of food.

A quick study of Table 2 will reveal that all of the drugs listed are used for the treatment of specific infections, making specific, detailed knowledge of fish diseases and their treatments useful. It is also apparent that several drugs may treat the same condition.

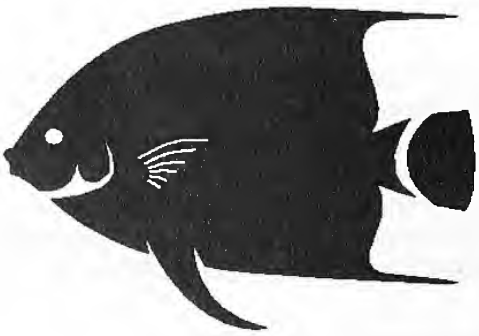

Table 1:

Lists medications with recommended dosages from various references.

MEDICATION	DOSAGES
Arthinol	1 gr. Arthinol/100 gr. food
Chlortetracycline	1 gr. Chlortetracycline/100 gr. food
Mercurous chloride	1 gr. Hg2Cl2/500 gr. food
Para-ureidobenzenearsonic acid	1 gr. para-ureidobenzenearsonic acid/ 500 gr. food
Chloramphenicol	1 gr. Chloramphenicol/ 1 Kg. food
Chloramphenicol	500 mg. Chloramphenicol/100 gr. food
Amebacillin	1 gr. Amebacillin/500 gr. food
3-5-Nitrofurfurylideneamino-2-Oxazoiidone	1 gr. Furazolidone/1 Kg. food
3-5-Nitrofurfurylideneamino-2-Oxazoiidone	50 mg. Furazolidone/1 Kg. food
3-5-Nitrofurfurylideneamino-2-Oxazoiidone	300 mg. Furazolidone/100 gr. food
Isonicotinic acid hydrazide	3 mg. Isonicotinic acid hydrazide/1 Kg. food.
Kamala	1 gr. Kamala/500 gr. food
Kanamycin	1 gr. Kanamycin/1 Kg. food
Kanamycin sulfate	50 mg. Kanamycin sulfate/1 Kg. food
5-Nitro-2-Furaldehyde semicarbazone	1 gr. Nitrofurazone/1 Kg. food
4, 7-Phenanthroline-5, 6-Dione	1 gr. 4, 7-Phenanthroline-5, 6-Dione/1 Kg. food
Sulphaguanidine	1 gr. Sulphaguanidine/8 Kg. food.
Sulphamerazine	2 mg. Sulphamerazine/1 Kg. food
Sulphamerazine	220 mg. Sulphamerazine/1 Kg. food
Sulphisoxazole	1 gr. Sulphisoxazole/ 4.5 Kg. food
Oxytetracycline	1 gr. Oxytetracycline/1 Kg. food
Oxytetracycline	250 mg. Oxytetracycline/2.2 Kg. food
Oxytetracycline hydrochloride	55 mg. Oxytetracycline hydrochloride/1 Kg. food
Praziquantel	135 mg. Praziquantel/100 gr. food
Metronidazole	625 mg. Metronidazole/100 gr. food
Metronidazole	250 mg. Metronidazole/100 gr. food
Fenbendazole	250 mg. Fenbendazole/100 gr. food
Sulfadimethoxine-ormetoprim	50 mg. Sulfadimethoxine-ormetoprim/1 Kg. food
Amoxicillin trihydrate	50 mg. Amoxicillin trihydrate/ 1 Kg. food
Ampicillin sodium	50 mg. Ampicillin sodium/1 Kg. food
Enrofloxacin	10 mg. Enrofloxacin/1 Kg. food
Erythromycin	100 mg. Erythromycin/1 Kg. food
Flumequine	10 mg. Flumequine/1 Kg. food
Nifurpirinol	4 mg. Nifurpirinol/1 Kg. food
Oxolinic acid	10 mg. Oxolinic acid/1 Kg. food
Sarafloxacin	10 mg. Sarafloxacin/1 Kg. food
Sulfadiazine-trimethoprim	30 mg. Sulfadiazine-trimethoprim/1 Kg. food
Sulfadimethoxine-ormetoprim	50 mg. Sulfadimethoxine-ormetoprim/1 Kg. food
Sulfamethoxazole-trimethoprim	50 mg. Sulfamethoxazole-trimethoprim/1 Kg. food
Neomycin sulfate	250 mg. Neomycin sulfate/100 gr. food
Gabbrocol	2 gr. Gabbrocol/100 gr. food
Nitrofurantoin	150 mg. Nitrofurantoin/100 gr. food

Table 2:
Lists medications and what the medications are effective against from various references.

MEDICATIONS	EFFECTIVENESS
Arthinol	Octomitiasis
Chlortetracycline	Octomitiasis (Causes avitaminoses)
Mercurous chloride	Octomitiasis (Highly toxic)
Para-ureidobenzenearsonic Acid	Octomitiasis
Chloramphenicol	Gram-positive & gram-negative and some protozoa.
Amebacillin	Octomitiasis
3-5-Nitrofurfurylideneamino-2-Oxazoiidone	Furunculosis, Internal sporozoan.
Isonicotinic Acid Hydrazide	Tuberculosis
Kamala	Tapeworms
Kanamycin	Pseudomonad acea & Aeromonas
5-Nitro-2-Furaldehyde Semicarbazone	Gram-positive & gram-negative & sporozoa
4, 7-Phenanthroline-5, 6-Dione	Octomitiasis
Sulphaguanidine	Furunculosis
Sulphamerazine	Worm cataract
Sulphisoxazole	Infectious kidney & liver disease
Oxytetracycline	Anti-biotic
Praziquantel	Anthelmintic
Metronidazole	Antibacterial & antiprotozoal
Fenbendazole	Nematodes
Sulfadimethoxine-ormetoprim	Edwardsiella ictaluri
Amoxicillin trihydrate	Beta-lactam anti-biotic
Ampicillin sodium	Beta-lactam anti-biotic
Enrofloxacin	Aeromonas
Erythromycin	Anti-biotic/Streptococcosis
Flumequine	Gram-negative bacteria
Kanamycin sulfate	Anti-biotic
Nifurpirinol	Anti-biotic
Oxolinic acid	Gram-negative bacteria
Oxytetracycline hydrochloride	Static inhibitor of bacterial protein synthesis
Sarafloxacin	Aeromonas, Vibrio, & Edwardsiella
Sulfadiazone-trimethoprim	Anti-biotic
Sulfadimethoxine-ormetoprim	Aeromonas & Edwardsiella
Sulfamerazine	Anti-biotic (wide spread resistant strains)
Sulfamethoxazole-trimethoprim	Anti-biotic
Neomycin sulfate	Gram-negative bacteria & cocci
Gabbrocol	Intestinal flagellates & ciliates
Nitrofurantoin	Pseudomonas, Aeromonas, & Vibrio

The research conducted by The Florida Aquarium yielded some potentially useful information in the treatment of marine fish disease. Most of this data had very specific applications, however, and the bits and pieces gleaned are just the beginning of putting together a more concessive plan for treatment of fish. It was noted that certain medications treated only one or two particular ailments, sometime with varying effectiveness on different fish.

In addition, carrying out experimental procedures itself will not be without its

occasional difficulties. Administering medication orally in fish food means that gathering the data depends largely on the day-to-day eating preferences of the fish. They may not take in the drug either because of how it affects the taste of the food or because they simply are not hungry. The Florida Aquarium would like to make additional studies, perhaps with varying food and drug mixtures with carefully controlled feeding times, on specific species.

References:

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ABC's . . . .

Animal Behavior Concerns & Solutions

A Question and Answer Forum for the Zoo Professional

By Diana Guerrero, Independent Behavior Consultant,
Ark Animals of California, San Diego, CA

(Editor's Note: Due to a computer transmission glitch, the July ABC's column was missing some information in the questionnaire portion of the column. Therefore, we are rerunning the entire column this month with the inadvertently deleted information included. We apologize for this error.

COMMENT/QUESTION
Thanks for all the help and time you spent with us on our behavior question. It might be useful to others if you included some of the questions you asked us on our evaluation in the ABC'S Column. We think it would be of benefit to other institutions if you did.

ANSWER
Thanks for the continued questions and positive comments/feedback! I will call this month's column: What information to supply to assure a beneficial evaluation.

EVALUATION TIPS: Knowing what questions to answer is half the battle! Due to space constraints it is not always possible to include some of the questions that are asked or discussed in the fact finding phase of a behavior evaluation. Providing important information is a must in any evaluation. Here are some general guidelines to assist those of you who need help with scenarios. The more of these questions you provide answers to, in advance, the better and faster the assessment can be. Please remember that all specific items are kept confidential when presented in the column.

PROBLEM BEHAVIOR(S)

1) Briefly describe problem
2) the age of the animal when the problem was first observed
3) how long the problem has been in existence
4) where it occurs and with which conspecifics
5) what particular situation it occurs in
6) frequency
7) how you have attempted to correct it
8) other things you think are important to know

HUMAN INFORMATION

Name of persons working on this problem:
Mailing address of institution(Street or PO Box):
City:
State:
Zip Code: TIME ZONE: P M C E Other_____
Work Phone: ( ) FAX Line: ( ) E-mail:

Other Participants M/F Relationship with animal(s) Time on area
1.
2.
3.
4.
5.

Does anyone have any behavior experience? Y__N__ If yes, Who?

Has anyone ever attended a training program or behavior seminar before?
Y_____N_____
If Yes, Who conducted the program or seminar? When?

EXHIBIT INFORMATION

Please describe the exhibit to the best of your ability:

Can the animals be separated from each other?

Do they have individual night quarters?

Please list the other animals in the exhibit:
Name Breed/Species Age Sex Compatibility with animal(s)
1.
2.
3.
4.
5.

ANIMAL INFORMATION

Animal Name:
Breed/Species:
Sex: M_____ F_____
Age:
Age this animal was obtained:
From where?

Mother-reared?
Wild-caught?
Nursery-reared? By whom?
Age taken from mother?
Litter behavior/birth order?
How long have you had this animal?
Do you intend to breed this animal?
List prior facilities:

List any health or physical problems:

Is this animal on medication? Y_____ N_____ If yes, what? Why?

Was this animal ever seriously injured or ill? If so, please explain:

Has this animal been cleared for allergies? Fungal infections? Thyroid, adrenals or other physical abnormalities?

Veterinarian:
Phone ( )

Is this animal allowed on exhibit with conspecifics?
Where does this animal sleep and with whom?
Who does this animal interact with most? the least?

What is the current diet? How many feedings? Enrichment? Supplements?

How often is enrichment used?
Is this animal able to participate in this activity?
What types of interactions occur in the exhibit? Any aggression?
Has this animal ever received any formal training?
At what age?
Trainer's name:

How have you reinforced acceptable interactions?
How have you reprimanded or handled aggressive or unacceptable behaviors?
Animal's reactions to these actions?

Has this animal been injured by another animal on exhibit?
Has this animal injured any conspecific?
What were the circumstances?
How many times has this occurred?
How long ago was the latest incident?

In stress situations (new situation, strangers, visitors, left alone, confinement, etc.) how does this animal react?

Would you describe this animal as:

Wildly active
Active
Confident/Assured
Reserved
Withdrawn
Stiff/lethargic
Fearful/Unsure

OTHER NOTES:

Next Month: Understanding Applications of the Bridge and Bridging Criteria: Part One - An Overview

If you would like to submit a behavior question/scenario for discussion in this column, please use the guidelines listed above for providing information necessary for such an evaluation. Requests for behavior evaluations should be send to Diana Guerrero a t Ark Animals, Inc., P. O. Box 1154, Escondido, CA 92033-1154 or directed to her e-mail address listed below.

About the Author: Since 1978 Diana has been active both in the U. S. and England working with zoos, private collections, an oceanarium, a marine aquarium, and other animal-related organizations involving captive wildlife. She has a broad base of animal experience involving movie & television training, zookeeping, show performances with live animals, education, behavior management, modification and enrichment, rescue and rehabilitation as well as captive breeding and management of endangered species. She is currently working as an Animal Behavior Consultant and Trainer with both exotic and domestic animals, she has authored numerous articles on animal behavior and training. If you have questions for Diana, you may contact her at 1-800-818-7387 or via the email listed below. ***NOTE****: The Ark Animals' Website has completed the change to Electronic Magazine Format. The "Ezine" features articles related to captive animal behavior, enrichment, conservation, and similar topics. The publisher welcomes electronically submitted articles (previously published or new work). Deadline is the 10th of the month previous to publishing. Interested parties may contact the publisher at E-mail: arkabc@arkanimals.com Website address is http://www.arkanimals.com*

AAZK Book Sale

Sale price is 20% off list price

Sug. $	Sale $	
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TO ORDER: List the books you want along with your name and complete mailing address. Include shipping fee of $2.00 for the first item and $1.00 for each additional item. Make checks or money orders payable to "AAZK Book Sale" (U.S. FUNDS ONLY - no cash or COD, please). Domestic orders only. Please allow 6-8 weeks for delivery. Mail orders to: AAZK Beardsley Chapter, Attn: Gail Rice, 1875 Noble Ave., Bridgeport, CT 06610-1600. (203) 394-6563 (Education Ext.).

Komodo Dragons at Miami Metrozoo

(Varanus komodoensis)

By
Tom Condie and Pam Monseur
Asian River Life / Komodo Keepers
Miami Metrozoo, Miami, FL

Komodo dragons (*Varanus komodoensis*) are the largest living lizards. Their range is limited to the Sunda Islands in Indonesia. They are endangered and considered national treasures by the Indonesian government. They can reach average lengths of 2.74m (9 ft.) and can weigh well over 36 kg (300 lbs.). They are the largest land carnivores and on top of the food chain in their native habitat. They feed on anything they can catch including deer native to the islands and introduced species such as goats, wild boar and buffalo. Young dragons are mainly insectivorous and will live up in trees for the first three to four years where they are safe from predation by larger dragons. Young komodos will also feed on mice, birds and eggs and will come to the ground only when they are big enough to compete with others.

Metrozoo's Komodo dragons came to us after many years of planning and hard work by our administrative staff and the government of Indonesia. Funds were collected, permits to import adult animals were acquired, and a new exhibit was designed. Many more months of coordination went by before our staff was finally ready to travel to Indonesia and spend two weeks training and getting to know the animals before bringing them home.

Our pair was housed in a pit-like exhibit at the Taman Safari Park in Bogor, west of Java. A total of five animals were housed together. All had been wild-caught and had been at the zoo for about five years. The animals went through a complete physical exam that included first of all x-rays to determine their exact sex, blood tests, measurements and parasite treatment.

All the keepers at Taman Safari were originally from the Island of Flores and seemed very experienced at hand-restraining these animals. None of them has ever seen a catch-pole before and proceeded to use it as a push stick. After they were shown the proper use of a catch-pole, they realized what a wonderful tool it was and requested for our staff to leave it with them. Crates were custom-made for each of our animals. The pair was crated and sent on their way to the U. S. on a 23-hour flight.

Our animals arrived on 13 June 1995, and were released in a12m x 12m (40 ft. x 40 ft.) pen in the quarantine area. The pen contained a few shade trees and a pool measuring 4m x 1 m deep (13.12 ft. x 3.28 ft. deep). Because of the cooler weather later in the year, a shelter was built with a hog warmer buried in the sand to provide them with a warm area.

Taman Safari fed their Komodos mainly rats so we decided not to change their diets. Quarantine keepers soon discovered that the male would do anything for a rat and they used this to their advantage in shifting him into another pen when necessary.

Prior to their arrival, the male and female had been separated, but seemed to get along when they were released from their crates into the pen. On a few occasions during their stay in the quarantine area they had to be separated due to the male injuring the female during breeding attempts. The pair spent a total of six months in the quarantine area before their new exhibit was completed. On the day they were moved to their new home both animals were transported to our hospital to be examined once again.

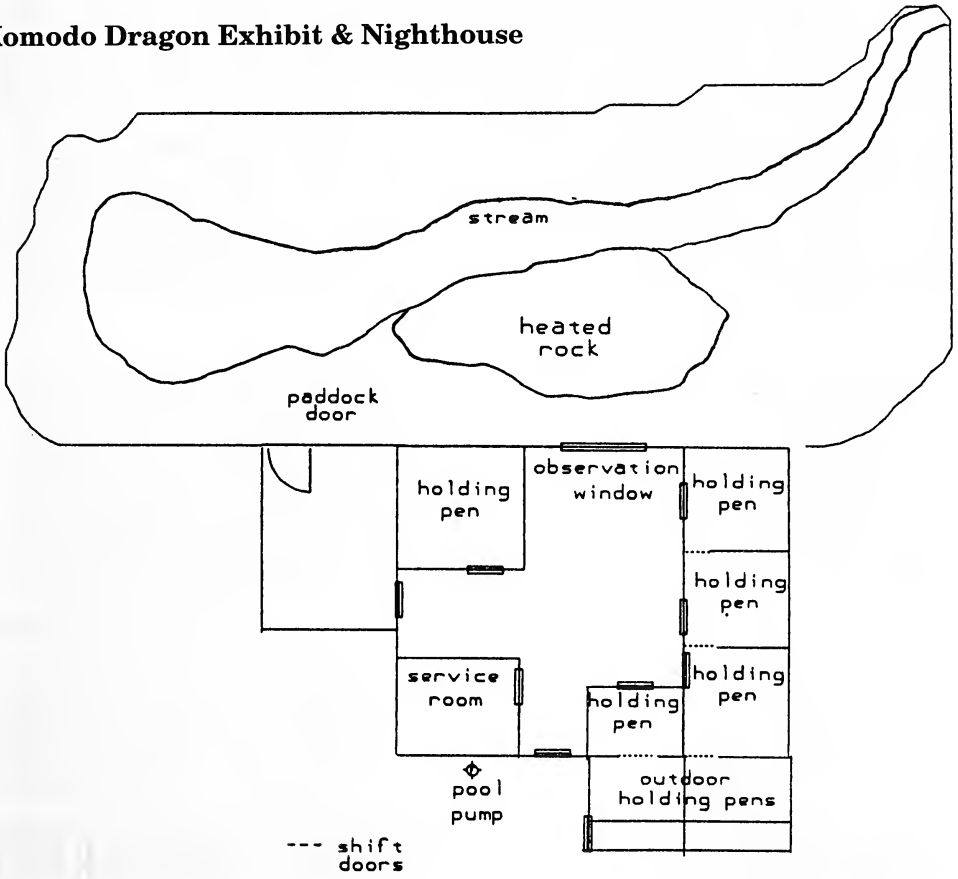
Our male "Jack" weighed 63kg (139 lbs) and measured 2.23m (7' 3") from snout to tail. He is a very nicely colored animals with bright lime green and yellow adorning his head and neck, fading to the rusty orange coloration of his body. The female dragon weighed in at 35kg (77 lbs.) and measured 1.8m (5" 10"). She is a little less brilliantly marked than the male, but does have unusually red lips for a lizard, hence her Indonesian name "Lubier". Because both animals were wild-caught, we do not know their exact ages. However, we estimate that both are approximately eight to ten years old.

The Komodo display was constructed to resemble a nearly dried up stream bed from the lizards' islands. The most obvious and important need for these large cold-blooded creatures was to provide plenty of heat sources, thus enabling our

Komodo Dragon Exhibit at Miami Metrozoo. *(Photo by Ricardo Stanoss)*

dragons to thermoregulate. Luckily in Miami, heat-loving lizards have it pretty good. The mostly open-to-direct-sunlight design of the exhibit gives our varanids all the radiation absorbing opportunities they could possibly want. To further help on cool days, the exhibit's central basking "rock" is warmed by hot water circulating through pipes inside the fiberglass. A ledge, which by design looks to have been carved out by the flow of water, houses a radiant heater in its ceiling. The ledge also provides additional shade.

Komodo Dragon Exhibit & Nighthouse



The Komodos' nighthouse is designed to help us house, observe and manipulate our charges. Abundant heat sources are the building's main features. The varanids primary source of warmth within the buildings is their heated floor. All the floors in the holding pens have hot water pipes running underneath them. Temperature of the floors can be maintained at 29-32° C (85-90° F). This enables the animal to sleep directly on the concrete and not have it soak out all of their bodily warmth. The heated floors will also keep the air temperatures quite warm in the building. On some of the very cold nights that we had this past winter, we utilized the central heat/AC unit to maintain the temperature in the building. Should we ever require, each holding pen is also equipped with an infrared heater in the ceiling. There are holding facilities for five animals inside the nighthouse. Each pen is constructed of cinder blocks from the floor to

a height of 1.2m (4 ft.) , and then fiberglass grid up to the ceiling. The enclosures measure about 3m x 2.1m (10 ft. x 7 ft.). There are guillotine doors between each pen for shifting animals. Two holding pens in the back of the building are also connected to outside enclosures.

One of the first challenges we faced was helping our animals adjust to the exhibit life. The male dragon "Jack" was fairly accepting of his situation. His driving force in life was to consume as much food as we would offer him. So it was a relatively easy matter to "train" him to go on and off exhibit. On the other hand, "Lubier" clung tightly to her solitary lifestyle. For weeks on end she acted stressed by all the patron activity in the front of the display. She would not eat when anyone was present, and refused to enter the nighthouse. Finally the decision was made to use "Jack" as our main display animal and to house the female off-exhibit. Although she still does not enjoy any keeper activity in the service area, she has been doing much better off-exhibit. Recently she has even accepted food items presented via Pilstrom tongs. Although we utilize bird of prey, horse meat, rabbits, and chickens, the majority of the dragons' diet has been freshly killed rats.

Our next challenge will be getting the dragons together for breeding. In all the interactions we have observed, our male has been more than ready, but "Lubier's" slow acceptance of things has made her uncooperative. Her resistance to captive life, perhaps coupled with changing hemispheres in the last year, have affected her breeding cycles. We think that given more time, perhaps allowing for some seasonal temperature and light cycle changes, our female dragon will come around. Hopefully Metrozoo will hatch Komodo dragons in the next year or two.

TIGER SUPERMARKET

An undercover survey of Chinese pharmacies and supermarkets in New York revealed that over 80% of the stores sold products claimed to contain tiger parts, the Environmental Investigation Agency says. "It is outrageous that tiger products banned all over the world can be so easily purchased in New York," said EIA's Dave Currey. The survey comes as EIA launches a campaign to protect Indian tigers, which the group says are poached at a rate of one a day. President Clinton should raise tiger conservation on his visit to India this year, EIA says.

-- GREENLINES ISSUE #331 3/10/97

Legislative Update

Compiled by Georgann Johnston
Legislative Advisor
Sacramento, CA
1-800-338-7348

CITES Meeting Closes With Mixed Results For Endangered Species

Background:

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), entered into force on 1 July 1975 and now has a membership of 136 countries. These countries have all agreed to ban the commercial trade in a number of plant and animal species and have agreed to both regulate and monitor trade in others that might become endangered.

To facilitate this agreement, CITES has developed a system for categorizing endangered and threatened species, which it lists in two main documents, or Appendix, to the CITES agreement. Appendix I species are considered to be "Most Endangered" while "Seriously at Risk" species are placed in Appendix II. Under Appendix I, no permits are issued for international trade unless there are exceptional circumstances and under Appendix II, permits are strictly controlled "to avoid utilization incompatible with their survival."

1997 CITES Meeting:

From June 9 through 20, delegates to the Convention met in Zimbabwe for the purpose of considering proposals regarding changes in the listing of individual species. At the time the convention began, there were approximately 50 mammal, bird, reptile, fish, invertebrates and amphibian species which were the subject of one or more proposals presented by various countries for consideration. (Numerous plant species were also considered but will not be discussed here.) The proposals included uplisting or downlisting the species from Appendix II to I or vice-versa, to remove the species from protected status, or to allow limited trade in certain designated populations of a species, despite their Appendix I or II status. By the end of the meeting, a vast majority of the proposals had been withdrawn and the remainder were presented to the convention delegates for a vote.

In addition to resolutions and proposals regarding animals and plants, the COP-10 delegates also addressed certain procedural issues regarding the operation of the convention itself and future actions to be taken by the CITES signatory countries with respect to enforcement measures. The most significant outcome in this regard was a vote in favor of a secret ballot, something that was prohibited during the past nine conventions. Now, delegates will be able to vote in secret

and their country's position on a given measure can be kept from the media, other delegates, and ultimately the public.

Passage/Defeat of Proposals of Interest to Zookeepers:

Space does not allow a complete summary of each proposal for each mammal, bird, or reptile, which might be of interest to Animal Keepers' Forum readers. The following provides a brief overview of significant actions regarding some of the major species of interest to animal keepers.

African Elephants: The basic proposal was to move certain populations of this species to Appendix II with precautionary measures, including export quotas. Under a resolution passed by the Convention, the countries of Zimbabwe, Botswana and Namibia will be allowed to resume the sale of stockpiles of ivory tusks - amounting to a total of 59.1 tons in all three countries - in 18 months if they are able to demonstrate "leakproof" control of the reserves. In effect, the sales will go forward only if the countries can demonstrate that "contraband" ivory, taken by poachers from living elephants residing within the countries' borders, is not somehow included in the sales. As of this writing, all of the existing ivory stores are scheduled to be purchased by Japan. Zimbabwe also will be allowed to export elephant hides, leather goods and small ivory souvenirs beginning in 90 days. The three nations promised that no elephants will be legally killed for trade, and that the ivory will come from large stockpiles of tusks from animals culled to manage herds. The revenue must go toward conservation and community programs for wildlife.

Nile Crocodile: Populations in Madagascar, Uganda, and Tanzania are already on Appendix II. The proposal was to grant Madagascar and Uganda temporary quotas so that they may commence ranching the species for export. Likewise, Tanzania, which has an existing ranching program, requested an increase in the quota of wild

White Rhinoceros: South Africa proposed that it be allowed to investigate the impact of reopening rhino horn trade with a report and proposal for future action to be brought up at the COP-11 meeting two years hence. The proposal was rejected, with the convention utilizing the new "secret ballot" method, with 54 "yes" votes, 48 "no" votes, and 10 abstentions. A spokesperson on behalf of South Africa said the National Parks Board was disappointed since South Africa is seeking to find a market for its stockpiled rhino horn, not to reinstate rhino hunting for sport or for ivory.

Minke/Bryde's Whales: Proposals submitted by Norway and Japan to downlist two populations of Minke whales and one population of Bryde's whales from Appendix I to II were rejected by CITES delegates, along with negative votes on five additional resolutions designed to divorce the International Whaling Commission from CITES.

Sturgeon: Convention delegates voted unanimously to restrict exports and

imports of Russian caviar—fish eggs coveted as one of the world's finest delicacies. Every country that exports or imports caviar must take steps to regulate trade beginning April 1, 1998. The most severe limits are expected to be on Caspian Sea beluga sturgeon—the source of the world's most prized caviar, which sells for about $50 per ounce in California gourmet stores.

The restrictions were endorsed by officials from Russia and other nations bordering the Caspian Sea. who will be responsible for setting quotas on their exports. To date, these countries have been unable to control poaching and smuggling, so enforcement for the most part will be up to the United States and other importing countries. Caspian Sea sturgeon are at risk of extinction from overfishing because of a thriving caviar black market. Supporters of the resolution argued that adult sturgeons, which normally live long lives and spawn irregularly, are killed when eggs are collected, causing steep declines in the fish population that were first noted in the mid-1970s.

Additional Species Considered by COP-10: Grey whale, American bison, banteng, Brooms pygmy possum, South American armadillo, Bennet's tree kangaroo, jaguar, vicuna, writhed-billed hornbill, green avadavit, black-billed parrot, green-cheeked parrot, sulpher-crested cockatoo, weka, Hill myna, Java sparrow, Seven-colored tanager, Kuhl's lorikeet, broad-snouted caiman, painted terrapin, timber rattlesnake, alligator snapping turtle, Indian monitor, yellow monitor, Mantella frog, and sawfish. Information regarding the exact nature of the proposal and its outcome can be obtained by calling the author of this column at the number listed above.

Information contained in this article were derived from the following sources and publications: Los Angeles Times; WildNet Africa CITES Issues, an online publication of WildNet Africa! Travel Service; U.S. Fish & Wildlife Service CITES Web site and Press Releases; International Fund for Animal Welfare Press Releases, South African Mail & Guardian Newspaper, The Pretoria News, The South African Herald Newspaper; the New York Times.

Trade In Alien Species Poses Grave Threat To Global Biodiversity

The United States was joined by a number of other party nations during the 10th Conference of the Parties of the Convention on International Trade in Endangered Species held in Zimbabwe in recognizing that alien (non-indigenous) species are second only to habitat loss as a threat to the world's biodiversity. In addressing this critical global issue, the United States, Argentina, and New Zealand submitted a discussion paper, "Trade in Alien Species," containing several measures countries might take to curb the spread of invasive wildlife species.

Alien species are introduced into native ecosystems either unintentionally during human activities such as trade or intentionally when linked to industries such as agriculture, recreation, horticulture, forestry, and aquaculture. With the global trade in wildlife and its products estimated at $5-8 billion annually, the

risk of unintentional introductions of alien species continues to increase.

In the United States, more than 300 non-indigenous fish and wildlife species have already established free-living populations, approximately 122 of which are causing great harm. For example, in Georgia native fishes and invertebrates in freshwater ponds have been seriously impacted by the proliferation of swamp eels, a species popular in the aquarium pet trade. People release unwanted pet swamp eels into these ponds where the eels prey upon the indigenous species.

The recommendations aimed at stemming this problem include: the consideration of the threats alien species pose when developing and implementing sustainable use management plans for species in international trade; cooperation with CITES and the Convention on Biological Diversity and other international organizations; working with the IUCN Invasive Species Specialist Group to identify species in trade which have the potential for becoming invasive; and to heighten global awareness as to the deleterious impact of invasive alien species.

Source: U.S. Fish and Wildlife Service, June 12, 1997

Live birds that are being smuggled into the U. S., Canada and a number of other countries are often confiscated by customs officials, fish and wildlife agents, or other governmental entities. I am looking for statistical information on how many birds are confiscated each year, particularly in the U. S., and what happens to them after they are seized. Some information from the USFWS indicates that, in the past, confiscated birds were offered to zoos. Do you have any birds at your zoo which came from a smuggling/confiscation situation? Do you have any contact with any governmental entity that confiscates smuggled birds? Any information or leads about contacts in this area would be greatly appreciated. Contact Georgann Johnston, AAZK Legislative Advisor at (800) 338-7348.

Information Please

We are currently designing an American Black Bear (*Ursus americanus)* exhibit to house a minimum of four bears. We are gathering information and would appreciate comments from keepers who have recently opened a bear exhibit. Please tell us what you like and dislike about your enclosure. Your response to this inquiry will be followed up by a more detailed questionnaire. Please send information to: Amy Van Der Molen, c/o Folsom City Zoo, 50 Natoma St., Folsom, CA 95639; Fax (916) 355-7227 attn: Amy. Thank you in advance for your assistance.

Has anyone had experience with cataracts in cougars (*Felis concolor*)? We have a 15-month-old female that has been diagnosed with bilaterally symmetric mature cataracts. They are centrally located, triangular in shape, and cover about 50% of each eye. Please send any information to: Heidi Hellmuth, Curator, Loon Mountain Wildlife Theater, Route 112, Lincoln, NH 03251; Phone - (603) 745-6281 ext. 5561; Fax (603) 745-8214.

Chapter News Notes

Columbus Zoo AAZK Chapter

The officers for the Columbus Zoo Chapter for 1997 are:

Andy Jakobsky.....President
Lynn Kesler.....lst Vice President
Scott Shelley.....2nd Vice President
Gretchen Bickert.....Gretchen Bickert
Shelly Roach.....Secretary

These officers have good ideas for this year and this should rejuvenate our Chapter. Also, we are having a membership drive to boost not only our local Chapter but also National AAZK.

--Lori Wright, Chapter Liaizson

Extinction Rate Climbs

In the next 30 years up to 25% of the world's tropical bird and plant species will become extinct if tropical forests continue to be destroyed at the current pace, Kyodo reports. The World Bank cites this as 1,000 to 100,000 times the natural extinction rate.

----GREENlines #401 6/17/97

Moving?

If you are moving, please remember to send or call in your new address to AAZK Administrative Offices. Your *AKF* will NOT automatically be forwarded by the Post Office and you may end up missing one or more *AKF* issues.

Bowling for Rhinos T-Shirt Available

The Dallas Zoo AAZK is offering their 1997 Bowling for Rhinos T-shirt for sale to interested persons. It was designed by Janie Coleman, Dallas zoo staff graphic artist and features four rhino species representing the sanctuaries supported by BFR. The T-shirt is black and teal and sells for $12.50 each. If interested you may contact Ann Stevens at the Dallas Zoo (214) 670-6798 or Fax (214) 670-6717.

By Kayla Grams, Arizona-Sonora Desert Museum
and Gretchen Ziegler, Sequoia Park Zoo

Greetings to everyone out there in Zooland! We would like to send a huge thanks to all of you who have submitted ideas in the last months. Our whining really paid off - we have received some excellent material. We have a few pieces yet to run, but soon we'll be desperate for more. The following item is a great example of the truly inspired ideas keepers dream up when they observe the animals and ponder their behaviors with enrichment in mind. Write us about *your* ingenious brainstorm and how it affected animal (and visitor) behavior.

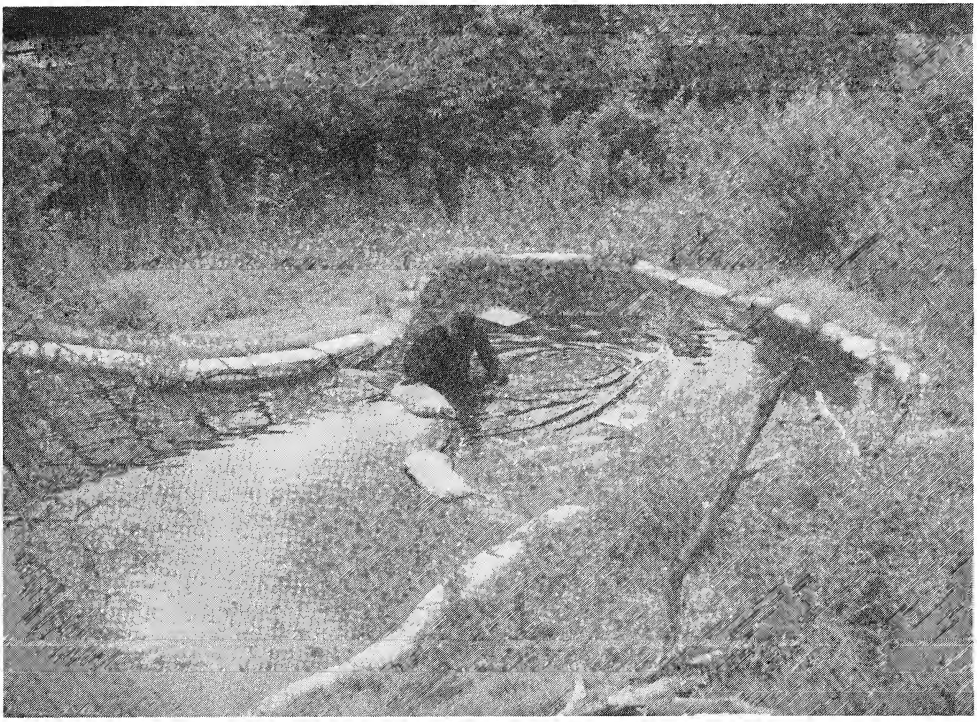
GORILLAS: One of our most unique enrichment ideas was inspired by our silverback gorilla "Rocky". His exhibit has a water feature with a stream and two shallow pools. We had seen him splashing hands and feet in the stream, even occasionally sitting in it. Unfortunately, these behaviors took place in areas that were difficult for the public to see.

We came up with "the buoyant buffet" to encourage his water play in a better viewing area, and to provide a challenge for him. Materials were inexpensive; they consisted of scrap plywood, cinder blocks, and baling twine. We used two sections of plywood, approximately 6.m x .9m (2 ft. by 3 ft.) A hole was drilled in each sheet, and baling twine was run through the hole and secured with a knot. The other end of the twine was attached to the cinder block, and the length of twine was just long enough to allow the plywood to float on the surface of the pool.

We then loaded the plywood surfaces with various treats, including frozen juice "ape-cicles", raisins, grapes, and other attractive items. We placed the floating feasts in the pool and let "Rocky" out. Initially he was hesitant and seemed a bit irritated at this presentation of food, but eventually he waded into the water and retrieved the treats.

"Rocky" now will wade into the pool when food items are tossed in. We no longer need to float them on the surface. He even makes use of the pool occasionally during our hot Arkansas summers, sitting on the bottom, with his arms stretched along the pool's edge. He appears to enjoy this, and the public certainly does.

—Ann Rademacher, Great Ape Keeper
Little Rock Zoo, AR



"Rocky", a 1.0 lowland gorilla from the Little Rock Zoo, Little Rock, AR, wades into his exhibit pool to enjoy his "bouyant buffet" of raisins, grapes and frozen "ape-cicles" - a unique enrichment which also allows him to cool off during the hot Arkansas summers.

(Ideas appearing in this column have not necessarily been tested by the editors for safety considerations. Always think ahead and use good judgment when trying new ideas. Eds.)

Breeding the Rhinoceros Hornbill
(Buceros rhinoceros)
at the Houston Zoo

By
Paul Schutz and Ric Urban, Keepers / Bird Department
Houston Zoological Gardens, Houston, TX

The rhinoceros hornbill (*Buceros rhinoceros*) is one of the largest of Asian hornbill species. The most outstanding characteristic of these birds is the large bill and upturned casque. The rhinoceros hornbill's body is entirely black with its abdomen, thighs, and undertail coverting to white. The tail is also white with a black band across the center (Kemp, 1995). As is the case with most hornbills, the sexes can be distinguished by eye color. The iris of the male is red while the female's is yellowish-white. Additionally, the male is a little larger in overall size and has black markings along the edges of the casque. The rhinoceros hornbill is a resident of the Southern Malaysian Peninsula, and the Indonesian islands of Borneo, Java, and Sumatra.

Hornbills use a most unusual nesting strategy. Once a hole or cavity in a large tree has been selected, the female will close, or plaster, herself inside for the duration of the incubation period, leaving only a slit large enough for the male to feed her. In the wild, rhinoceros hornbills lay 2-3 eggs between March and April (Kemp, 1995). Typically, only one chick survives until fledging in the wild.

The Houston Zoological Gardens obtained a wild-caught pair of rhinoceros hornbills in October 1989. After a 30-day quarantine period, the birds were moved to a flight cage 13.7m x 15.2m x 4.5m x 5.4m (45 ft. deep, 50 ft. wide, and 15 ft. high with an 18 ft. high cap). A nest box, constructed of one-inch thick plywood 78cm x 81cm x 139cm x 30 cm x 40cm (31" D x 32" W x 55" H with a 12" W x 16" H) diamond-shaped opening in the center of the face of the box, was placed on an 2.4m (8'ft.) platform in the exhibit. The nestbox was filled up to the rim of the opening with a substrate of pine shavings.

The wild diet of the rhinoceros hornbill consists mainly of fruit, especially figs, wild nutmeg and oil palm fruit. In addition the diet includes a variety of small vertebrates and large arthropods, such as lizards, tree frogs, spiders, large insects (beetles and crickets), as well as bird's eggs (Kemp, 1995). Despite their omnivorous feeding habits, the presence of the rhinoceros hornbill within a given area is contingent upon the availability of fruiting trees (Johns, 1982). The Houston Zoo diet consists of coarsely chopped fruits and vegetables (papaya, banana, soaked raisins, whole grapes, cooked sweet potato) and soaked Purina's Mazuri® brand parrot breeder pellets. Live food is offered twice daily and consists of crickets, giant mealworms, and a variety of sizes of mice. Nebraska Brand Bird of Prey® diet is also offered occasionally, but is not preferred by the birds.

In 1991 the Houston Zoo completed the construction of the Fisher Bird Gardens.

The pair of rhinoceros hornbills was transferred from the flight pen to a cage measuring 9.1m x 6m x 4.5m (30'L x 20'W x 15'H). The new unit was divided into an off-exhibit night shelter and an on-exhibit area. The staff was unsure of the compatibility of the pair even though no aggressive behavior had been displayed. The old nestbox and platform were transferred along with the birds to the new unit and placed in the night shelter. In the new facility, the male began to exhibit some aggressive behavior toward the female, chasing her for short periods of time. She would spend most of her time in the night shelter while he stayed in the front of the flight. Toward the end of 1991, the male was observed offering food to the female. Ritualized feeding, defined as the act in which food is offered by the male and either accepted or rejected by the female, is generally recognized as important in maintenance of the pair bond in hornbill (Reilly, 1986).

In 1992, while some aggression was observed early on, the staff was encouraged by continued observations of ritualized feeding. In March of 1992, copulation was observed for the first time. It consisted of four main behaviors: bill fencing, pre-mount hopping, mounting and copulation. Bill fencing consists of violent bill-to-bill contact, producing a loud and distinctive sound. Bill fencing often continues throughout copulation (Reilly, 1986). The male would hop over the female several times, each time pausing and bill-fencing for a second or two. The female then raised her tail and the male mounted her, spread his wings and lowered his tail over hers. During copulation the male flapped his wings to maintain balance and, as described by Reilly (1986), emitted a high pitched "whining" vocalization. The act of copulation could last anywhere from 2-3 to 30 seconds. Despite several observations of copulation, no further nesting activity occurred in 1992.

In 1993, a second nestbox was added to the front exhibit area. The dimensions of the new box were 76cm x 60cm x 121cm (30"D x 24"W x 48"H) with a smaller 16cm x 30cm (6.5"W x 12"H) elliptical opening. The opening was surrounded with a loop of hemp rope to aid in adhesion of the plastering material. Copulation was again observed several times in February and March. For the first time evidence of interest in the nestboxes was seen. Pine shavings were tossed out of both boxes and a small amount of plastering was observed on the sides of the original nestbox's entrance. The male was also observed pounding on the opening of the original nestbox. Despite this initial interest, no further nesting behavior occurred.

Rhinoceros Hornbill
(Buceros rhinoceros)

Artwork by Autumn Beckman
Houston Zoo Volunteer

In 1994, behaviors indicative of a strong pair bond (Sheppard, 1988) were consistently observed, such as sitting close to each other and ritualized feeding. Copulation, as well as plastering and excavation of the original nestbox was again observed. After conversations with several other institutions, it was decided that the opening on the original nestbox was too wide. First, modification were made to the original box to bring the width of the opening to approximately 12cm (6"). Later in the year, the decision was made to remove the original nestbox altogether and move the more recent model from the exhibit area to the night shelter.

Nineteen-ninety-five proved to be a very encouraging year. In February of 1995, the pair began a period of intensive activity around the box. The male was observed inserting his bill, with an offering of food, into the opening of the box and calling to the female using a guttural grunting noise (Reilly, 1988). Both birds were observed on several occasions pounding on the opening and the rope that surrounded it, possibly to alter the size or shape of the hole. Then in late March 1995, the female was observed in the box for the first time. She was seen inside the box several times through May 1995, sometimes plastering or being fed by the male. In April 1995, we were very surprised to see the male in the box. He was seen in the box several times, often plastering, pounding on the inside of the box and calling to the female. As 1995 drew to a close, we were optimistic about the future, but sill concerned that perhaps the nest opening was too large. The next few month's activities would eliminate those fears.

The early months of 1996 brought the most activity to date. The female began spending more time in the nestbox than she ever had before and the male was observed in the box on many occasions. In February, the previously docile male became increasingly aggressive, following the keepers as they walked in front of the exhibit and in one instance flying at a keeper inside the exhibit. This kind of aggression is well documented (Reilly, 1988). There was an increase of food consumption and the diet was increased accordingly. Soaked Zupreem® Monkey Biscuits were added to the diet because they had been used as plastering material by great hornbill (*Buceros bicornis*) at the Houston Zoo. The main items being used to plaster with were banana, monkey chow, sweet potato, pine shavings, and feces.

On 25 February 1996, keepers observed bill fencing, pre-mount hopping and copulation. Nest excavations were apparent by the large amounts of pine shavings on the floor of the night shelter beneath the box. Copulations were seen daily for seven days. On 3 March 1996, copulation was noticed in the morning and mounting lasted about 15 seconds. The female was observed in the nestbox plastering before noon. Later in the afternoon, the male was seen in the box. After a minute or two, the male reached down and came up with an egg in his bill, tossing it a few times as he would a piece of food. When the keepers entered the night shelter, the egg was found broken under the box.

Throughout March of 1996, nesting behaviors seemed to taper off. However, as April began, observations of nesting behavior started to pick up again. Copulation, plastering, and the female in the box were all observed. The male had been observed in the box on a few occasions. The female was staying in the

nestbox for longer periods of time, with the male bringing food to the nest and offering it to the female. For the first time, on 26 April, the female even stayed in the box when keepers entered the night shelter. The last day the female was seen out of the box was 27 April. Even though the female had not completely sealed herself in, the nesting period presumably had begun.

The incubation range is listed as 37-42 days (Reilly, 1986). Throughout the female's internment, a large electric fan was placed in the night shelter to combat the high temperatures typical of Houston summers. On 5 June 1996, the male was seen at the nest opening, his neck stretched upward appearing to get a good look into the nestbox. Consumption of crickets increased substantially, which is usually indicative of the presence of chicks (Reilly, 1988). On12 June, chick vocalizations were first heard coming from inside the box. The diet was further bolstered with newborn rats and mice. By the 23 June, the chick vocalizations were loud and could be heard outside the exhibit. On 29 June, a chick's beak was observed at the nest opening for the first time. On 1 July the adult pair was heard simultaneously vocalizing, the female's vocalizations somewhat muffled by her being in the box. The consumption of crickets seemed to decrease over the first couple of days in July. On 2 July 1996, 66 days after internment began, the female was out of the box when the keeper checked first thing in the morning. Her bill and casque were partially covered with debris from plastering and it had appeared that she had gone through at least a partial molt while in the box. The male offered her a rat pup and she flew to the nest opening, stuck her head in the nest, and offered the morsel.

From the data we had on file, we were concerned that this was a premature emergence and could mean there was something wrong with the chick(s). The decision was made to check the nestbox. There were two chicks in the box. One was about one-third larger than the other. The larger of the two was about 30cm (12in.) in height (in a squatting position) from the top of the head to its feet. Its feet were a yellowish tint and about 10cm (4 in.) in length. The bill was close to 15cm (6 in.) in length and its tail feathers had emerged about 5-7cm (2-3 in.). The smaller chick was about 25cm (10 in.) in height. Its feet were a more fleshy color. Its bill was about 10cm (4 in.) long. Its eyes were also somewhat cloudy. Both had wing feathers that had erupted about 5-7cm (2-3 in.). The box was very clean despite having three birds within its confines for so long. Tail feathers in the box indicated that the female had gone through a molt while in the box. The adults, which were locked in the front of the exhibit while the box was checked, produced a high pitched version of their "honking" duet call for the first time during this procedure.

The birds ate voraciously, about 2-3 times the normal adult diet. Skinned feeder mice were also added to the diet in addition to the rat and mouse pinkies already fed. Both parents participated in feeding the chicks, first filling up at the food bowl and then regurgitating for the chicks. The chicks became increasingly active inside the box, sometimes even sticking their whole heads out to investigate their surroundings. Both chicks plastered the opening but, like the adult female, did not completely close it off. If a keeper approached the box, chicks would begin to produce a loud "screeching" alarm call and the parents would become very agitated.

On 18 August, 113 days after the female's internment began, the first chick emerged from the box. It apparently moved fairly well around the exhibit, as it

was seen in several places. It was approximately two-thirds the size of the adults. On 1 September, 126 days after the female's internment, the second chick emerged from the box. The juveniles used a repetitive "rasping" call to beg for food from the parents. The young birds were chromosome (feather) sexed as 1.1. As early as 16 September the chicks became interested in eating on their own, poking around the food bowl or catching crickets without actually eating them. As the chicks grew older, the parents made a visible effort to wean them by letting them beg longer and longer before feeding them. Eventually, on 9 November, the chicks were observed eating on their own.

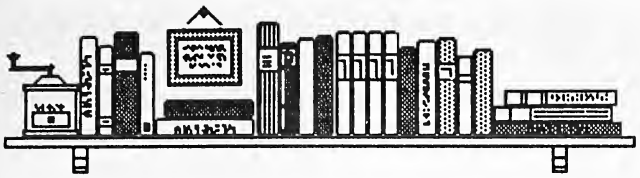
While chicks have remained with parents into the following breeding season, and even assisted in feeding chicks (Reilly, 1988), the adults in the Houston collection were not as tolerant. Aggression between the parents and their offspring was first observed on 26 September, and consisted of short periods of chasing. In early November, the chicks had to be caught up as blood was observed dripping from their feet. Upon further inspection, both chicks were missing either whole or parts of claws. We became concerned that these injuries occurred while the juveniles were fleeing from parental aggression. On 20 November, the chicks were transferred to an off-exhibit flight to await shipment to other institutions. By early December, the juveniles' casques, which were just small nubs at fledging, had begun to separate from the bill. Frith and Douglas' (1978) observations on the growth and development of a young male rhinoceros hornbill from nestling to subadult revealed that casque formation may be initiated by some form of destructive behavior on the part of the bird. We, however, did not observe this behavior at any time.

The breeding described here is hopefully the first of many at the Houston Zoo. Shortly after the removal of the juveniles, nesting activity began again. In late December 1996, the adults knocked most of the previous year's plastering off of the nestbox. Removal of pre-existing plastering is a natural occurrence when a cavity is reused (Poonswad, Tsuji, Ngampongsai 1987).

Hornbills are threatened throughout their range mainly due to habitat loss (Poonswad, Tsuji, Ngampongsai 1983). With the hatching of rhinoceros hornbills still relatively rare in captivity, the collection and exchange of information is critical. The staff of the Bird Department of the Houston Zoo will continue to collect data on the captive reproduction and management of this species and apply the information to the continuing work with both Asian and African hornbill species. Future plans encompass the installation of a camera in the nestbox to learn more about incubation and chick development. Through institutional communication and cooperation, we can all work together to conserve this magnificent species.

Acknowledgments

We would like to acknowledge the staff of the Houston Zoo Bird Department who have endured our infatuation in the collection of information on this species. Present staff members include: Curator-Chelle Plasse', Senior Keepers-Trey Todd, Lee Schoen, Joe Barkowski, and Keepers-Jerry Caraviotis, Tim Steinmetz, Brent McRoberts, Denise Brucchieri, Kay Oria, Roberta Hejna, Jim Dunster, Mary Carter, Jeremy Sorensen, and Hannah Bailey, many of who reviewed the work in progress or participated in the daily discussions on this subject. Additional thanks to the many individuals who have visited our facilities and were engaged in discussions on the general management of hornbills in captivity.



Book Review

The World of the Wolf -A Sierra Club Book 1996
By Candace Savage
Greystone Books, a division of Douglas and McIntyre,Ltd.
1615 Venables Street, Vancouver, BC, Canada
114 pgs. Hardback $27.50

Review by Lisa Peach, Carnivore Keeper
Chaffee Zoological Garden, Fresno, CA

The book, The World of the wolf, was written as an "intimate look at wolves in the wild." It covers such topics as the role of wolves in the history of world cultures, social order and reproductive practices of wolves in the wild, and the current situation of wolves in the world today. It draws people in with beautiful photographs designed to bring the reader close to the wild wolf, but it fails to carry through with the text.

The ancient history chapters are interesting and written in such a manner as to hold the reader's interest. The rest of the information, however, is anything but new. With only one third of the book devoted to text, there isn't enough space to include new research or updated information. In trying to have the reader bond with the subject matter, Ms. Savage resorts to trite anthropomorphic retellings of old grey wolf tales. The section on natural history and social structures carry on the timeworn image of wolves being at one with mankind; with the rearing of offspring treated as a chance to make us think there is a possibility of wolves rearing abandoned human children.

The World of the Wolf touches briefly on the history and plight of wolves other than grey wolves. The Red Wolf and Mexican Wolf for example, are covered in single photographs and a line o two of text. The main focus of this book is on the Grey Wolf and the stories we have heard about them. It does not seem to give the reader a sense of the diversity present in the world's wolf populations.

If you have a love of *Canis lupus* that knows no bounds, or a coffee table book collection that could use a beautiful addition, this book may be for you. A young adult forming a new interest in wildlife may find this book to be a great starting point. Any person looking for pretty pictures, a light read, or very basic information may also find that this book fills the bill. If, however, you are looking for a new, up-to-date source of information, new statistics, and a realistic view of a wolf's society; or if you want information on all types of wolves with a straight forward approach to interesting information, I would not recommend the World of the Wolf to fill your needs.

Hormones, Brain, and Behavior, Biology of the Reptilia Volume 18, Physiology E
Edited by Carl Gans and David Crews 1992
The University of Chicago Press
5801 S. Wllis Ave., Chicago, IL 60637
564 pages, paperback

Review by Bernard Gallant
Headkeeper, Magnetic Hill Zoo
Moncton, N.B. Canada

This book is a review of seven scientific papers written by several different authors. The co-editors begin with their review of what has been done in this field (title) for reptiles. The purpose of the book is explained by the author as, "(the book)....concentrates on the interaction of the hormonal and nervous systems in influencing the behavior of reptiles, primarily that associated with reproduction". There is also an author index, subject index, graphs, charts and pictures to help clarify what is being cited.

This is not light reading material. I found you have to concentrate when reading this book because it is essentially a textbook. I feel this book would be difficult for a novice in the field to understand for several reasons, such as the authors' preference to use scientific names and not always clarifying with the common names. As all true scientific papers do, this book raises more questions than it answers. However, it is a very good source of references when looking for papers on reptiles. Overall, if you are truly interested in reptiles or wanting to do research on them, this is a good book to acquire.

Mammals of Australia
Edited by: Ronald Strahan
Smithsonian Institute Press 1995
Washington, DC
Hardcover, 742 pgs. $65.00

Review by Angela Gilbert
AAZK Associate Member, Columbus, NC

This book was first written in 1983 under the title The Australian Museum Complete Book of Australian Mammals. The new title was adapted from John Gould's work 130 years ago. It is a compilation of 150 writers, researchers, and scientists giving of their time and expertise in the many different areas of this book. It is a very thorough and well-organized book, broken down from Classes, to Subfamilies and even Tribes. It also includes domesticated animals that may not have originated from Australia, but have been part of the environment and had an impact on the wildlife fauna for centuries, such as the fox, cat, and deer.

Each mammal is given a complete, detailed description including a map of where in Australia the mammal is most commonly found. The book is wonderfully illustrated with pictures of almost every species showing their unique features. It even includes animals who are now extinct but had a great impact on the Australian environment in their time such as the Tasmanian Tiger, the Lesser Bilby, and the Desert Rat-Kangaroo. These extinct animals—though not pictured, are very well and delicately illustrated.

This book is a perfect reference book for even the most avid Australian connoisseur. Anyone considering Australian animals as a research project would greatly benefit from this book. The only drawback is that there are so many animals to read about. Each animal is given about 1-2 pages and there are 742 pages in this book, so it is a lengthy study, but well worth one's time.

CRANES: Their Biology, Husbandry, and Conservation
Edited by David H. Ellis, George F. Gee, and Claire M. Mirande
Hancock House Publishers, 1431 Harrison Ave., Blaine, WA 98230-5005, 1996
Hardback, 336 pgs. $49.95

Review by Kelly Dwyer Ryder
Assistant Curator of Birds
Lowry Park Zool. Gdns., Tampa, FL

Cranes is published by Patuxent Wildlife Research Center and the International Crane Foundation in cooperation with the U.S. Fish and Wildlife Service, and represents the contributions of 21 crane specialists. As might be expected, it is truly the most comprehensive reference available on cranes to date.

As indicated in the book's subtitle, the text is divided into three general sections: biology, husbandry, and conservation. The biology section describes each species of crane, many of which are depicted in a set of colored plates. The natural history of each species is covered, including plumage, diet, habitat, and social behavior. The reproductive biology of non-captive cranes is also explained in particular detail.

The chapters on husbandry cover reproduction, veterinary techniques, guidelines for maintenance of pens, handling, restraint, transportation, and individual identification options. Specifications are given for indoor and outdoor holding facilities for adults and chicks, including a table of temperature tolerances for warm-climate cranes. An in-depth discussion of crane diets suggests feed formulas for birds of different ages and breeding statuses. A separate chapter is dedicated to predator and pest control.

Chapters focusing on reproduction include topics such as eggs and semen production, incubation, hatching, rearing, physiology, and genetic management are supplemented with an article on imprinting and attachment, issues requiring special consideration when hand-rearing cranes.

Medicine and surgery are addressed in sections with content ranging from simple exams to modern procedures such as cryopreservation. Artificial insemination, sex determination, and restraint each have a chapter dedicated to them. A glossary would have been useful for some of the veterinary terminology, but a standard veterinary dictionary can easily compensate for this omission.

Lastly, ecology, conservation, and wild population status are discussed. All 15 species of cranes are covered, with attention being focused on current conservation practices and future plans.

Cranes cover all the pertinent information that is currently known about these birds, and presents it in an easy-to-read format. The use of bold type for key terms allows the reader to skim through a section until they spot the topic they are searching for. Detailed charts and pictures supplement the text well. Extensive references are cited at the end of each chapter. For those interested in still more information, the addresses of leading crane research centers around the world are given. An appendix provides information on equipment and supplies mentioned in the text, with suppliers' addresses. This is the definitive reference for anyone who works with or specializes in cranes.

Institutions wishing to advertise employment opportunities are asked to send pertinent data by the ***10th of each month*** *to: Opportunity Knocks/AKF, 635 S.W. Gage Blvd., Topeka, KS 66606-2066. Please include closing date for positions available and when setting these dates keep in mind that because of bulk-mail, most readers do not receive the AKF until the middle of the month or later. There is no charge for this service and phone-in or fax listings of positions which become available close to deadline are accepted. Our phone is 1-800-242-4519 (U.S.); 1-800-468-1966 (Canada). Our FAX is (913) 273-1980.*

KEEPER...the San Diego Zoo is looking for a Keeper. Applicants must have previous bird experience and be willing to work with large mammals (tigers & tapirs). Applicants will work in a team environment. Interested applicants must be available to work any of the seven days of the week. This is a fully benefited, 40/hr/wk position. Submit a letter of intent, resumé and the names of three references to: San Diego Zoo/Human Resources Office, Otto Center (Attn: TRT #161505), P. O. Box 551, San Diego, CA 92112-0511. **Deadline to apply is 30 August 1997**. EOE.

ZOOKEEPER...the City of Lafayette's Park and Recreation Department has an opening for a full-time Zookeeper at the Columbian Park Zoo. Position requires a thorough knowledge of animal husbandry/biological sciences as required to care for animals held in captivity, emphasizing proper cleaning, feeding, grooming, medications, and general contact with animals. Minimum of two years experience required. Competitive salary plus excellent benefits. Resumés may be sent to: City of Lafayette, Human Resources, 20 N. 6th St., Lafayette, IN 47901 or e-mail: kwade@city.lafayette.in.us **no later than 1 September 1997**. EOE.

ELEPHANT HANDLER...requires minimum of three years experience working with elephants. Responsible for the care and husbandry of one female, 13-year-old African elephant. Must be able to do rides, demonstrations and give talks to the public. Looking for an eager, energetic, friendly, self-motivating person. Send resumé to: Natural Bridge Zoo, P. O. Box 88, Natural Bridge, VA 24578.

ZOOKEEPER...full-time position with benefits. Requires one (1) year paid exotic animal experience, high school diploma (college degree preferred). Will rotate to all areas of the zoo. Send resumé to: Dale J. Bakken, Director, Heritage Zoo, 2103 West Stolley Park Road, Grand Island, NE 68801 **by 1 September 1997**.

VETERINARY TECHNICIAN...requires completion of a Veterinary Technician degree or equivalent. Experience preferred. Starting salary $18,878.00. Responsible for management of laboratory and upkeep of hospital. Send resumé and list of two references to: Dr. William M. Bryant, DVM, Sedgwick County Zoo, 5555 Zoo Blvd., Wichita, KS 67212; (316) 942-2213, ext. 227; Fax - (316) 942-3781; e-mail: vets@scz.org

MAINTENANCE WORKER II...requires welding skills, concrete construction, experience with exhibit construction, ability and willingness to perform many types of maintenance and construction activities, valid and clean driver's license. Send resumé to: San Francisco Zoo, Human Resources, 1 Zoo Road, San Francisco, CA 94132. The San Francisco Zoological Society is an equal opportunity employer committed to diversity of staff.

SENIOR INSTRUCTOR/PHOENIX ZOO...**(Trainer/Presenter)** Requires four-year life science degree or equivalent training and experience, plus one year experience in work relevant to zoo husbandry. Responsible for developing and implementing a professional presentation that effectively communicates messages utilizing live animals. Train animals through operant conditioning to perform required behaviors. Partner with keeper staff to ensure complete animal care coverage. Salary $21,320.00 plus benefits. Send resumé to: Human Resources, Phoenix Zoo, 455 N. Galvin Parkway, Phoenix, AZ 85008-3431. **Position open until filled.**

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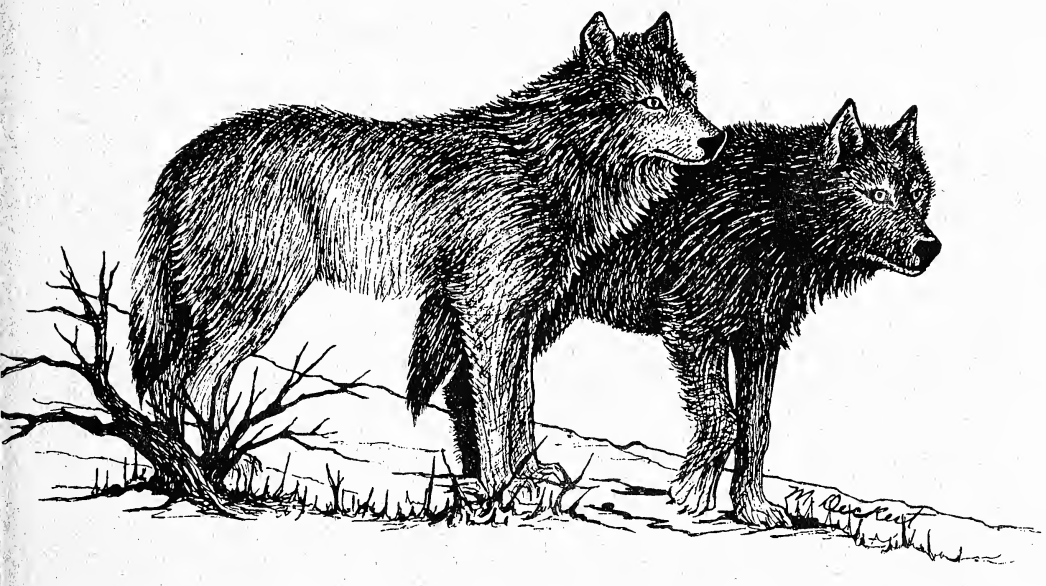

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SEPTEMBER 1997

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SEPTEMBER 1997
Vol. 24, No. 9

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printed on recycled paper with vegetable-based ink products

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About the Cover.....

Wolves have long been a facination to mankind and over the years have become the subject of both myth and literature. Featured on this month's cover is Canis lupus drawn by Mery Deckert, a Docent at the Los Angeles Zoo and a frequent artistic contributor to AKF. Wolves live to gether in packs with the dominant pair being the only ones in the pack to breed. Wolves mate spring and summer and the pair will stay together for life. After a gestation period of two months, the female bears several young and will nurse them for six weeks. The entire pack will assist in providing food for the young once they begin to eat a solid diet. Wolves are carnivorous and hunt a variety of animals from small pika to large deer and even wild boar. Thanks, Mary!

Information for Contributors

Animal Keepers' Forum publishes original papers and news items of interest to the animal keeping profession. Non-members are welcome to submit articles for consideration. Articles should be typed or hand-printed and double-spaced. Articles may be submitted on disk by arrangement with the Editor. All illustrations, graphs, charts and tables should be clearly marked, in final form and should fit in a page size **no greater than** 5.5" x 8.5" (14cm x 22cm). Literature used should be cited in the text (Brown, 1986) and alphabetically in the final bibliography. Avoid footnotes. Include scientific name (as per ISIS) the first time an animal name is used. Thereafter use common name. Use metric system for weights and measurements (standard equivalents may be noted in parenthesis). Use the continental dating system (day-month-year). Times should be listed as per the 24-hour clock (0800, 1630 hrs. etc.). Glossy finish black and white photos **only are accepted**. Color slides should be converted to black and white prints (minimum size 3" x 5" [8cm x 14cm]) before submission. Clearly marked captions should accompany photos. Please list photo credit on back of photo.

Articles sent to *Animal Keepers' Forum* will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for *AKF*. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed, appropriately-sized envelope. Telephone and FAX contributions of late-breaking news or last-minute insertions are accepted as space allows. However, long articles must be sent by U.S. mail. Phone 1-800-242-4519 (US); 1-800-468-1966 (Canada); FAX (913) 273-1980.

Deadline for each regular issue is the 10th of the preceding month. Dedicated issues may have separate deadline dates and will be noted by the editor.

Articles printed do not necessarily reflect the opinions of the *AKF* staff or the American Association of Zoo Keepers, Inc. Publication does not indicate endorsement by the Association.

Scoops & Scuttlebutt

A Message from the NEC

The Executive Committee is being formed for the election of the President and Vice President of our Association. The Committee is formed from the following individuals: Board of Directors (7), Two Immediate Past Presidents (2), Nominations and Election Committee Members (2), Chairs of the CPR, Bylaws, Research Grants, Awards, LINK, Historian, and Enrichment Committees (7) - for a total of no more than 17 individuals. If an individual is involved with more than one of the positions listed above, they would only cast one vote.

The selection process began on 15 July 1997 and will end 15 September 1997. The reason this calendar period is late in the year is because the only people eligible for these positions would be elected Board members with a minimum of a two-year term left to serve. Current eligible Board members are: Diane Callaway, David Luce and Lucy Segerson. The other eligible individuals would be the newly elected or reelected Board Members who are Ric Urban, Scott M. Wright, and Jacque Blessington. Interested candidates had to submit a resumé and platform statement to the NEC Chair for consideration. The newly-elected AAZK President and Vice President will be announced at the Houston Conference. *—submitted by Sheri Leavitt, NEC Chair, Houston Zoo*

Enrichment/Training Video Library Update

The Enrichment/Training Video Library recently received a grant from Universities Federation for Animal Welfare (UFAW), which is located in England, to convert the Library's video inventory from VHS NTSC format to the international formats of PAL and SECAM. Annually we receive many requests from overseas, but have been unable to meet this demand because our current Library inventory is in VHS NTSC format and incompatible with European/ International video players. While the tapes will still remain available in VHS NTSC format for domestic use, we are excited to announce the Library will now accept international requests for videotape loans.

Institutions and individuals who have donated videos to the Library will be sent "donation forms" which grant *The Shape of Enrichment*/AAZK, Inc. permission to copy and loan these videos and which also grants permission to convert these videos to PAL and SECAM formats for international distribution. Once signed releases have been returned to the Library, we will convert these videos. Institutions and individuals who have previously requested PAL or SECAM formatted videos are asked to resubmit their requests. We will fill international requests as videos become available. International distribution will follow the same lending rules currently adopted by the Library.

We are very grateful to UFAW for their support of this project which allows the Library to expand its services to our overseas colleagues.

Send requests or "donation forms" to: Lee Houts, 1118 Sherburn Ave., Sacramento, CA 95822-1019. **Please include e-mail address or Fax numbers with all correspondence.**

****Reminder:** When returning videotapes to the Library, please use "bubble mailers". Some videos have been damaged when sent in plain manila envelopes. Remember to include a return address, so we know who is returning duplicate videos. Thanks! *—submitted by Lee Houts, AAZK, Inc. Enrichment Committee.*

Donations Support Mexican Zoo Keeper Workshop & JKF

AAZK, Inc. and its International Outreach Committee (IOC) would like to express its thanks to the following Chapters and Institutions for helping to underwrite the travel expenses of the Keeper/Instructors who taught the Mexican Zoo Keeper Training Workshop curriculum: Atlanta AAZK Chapter, Atlanta, GA [$100]; North Carolina Chapter AAZK, Asheboro, NC [$75]; Detroit Chapter AAZK, Detroit, MI [$100]; Memphis Zoo AAZK Chapter, Memphis, TN [$250]; Capron Park Zoo AAZK Chapter, Attleboro, MA [$100]; and the Fort Worth Zoo, Fort Worth, TX [$300]. The International Outreach Committee of AAZK is chaired by Jeannette Beranger of Roger Wiliams Park Zoo, Providence, RI. The Workshop was held at the Morelia Zoo for three days in August with representatives from each Mexican zoo in attendance. The IOC put together the Workshop at the request of the Mexican Zoological Association (AZCARM) and worked jointly with them and the Zoo Conservation Outreach Group (ZCOG) to set up the curriculum in basic zoo husbandry to be taught to keepers by keepers. *(Editor's note: We will feature a synopsis of this first-ever Workshop in an upcoming issue of AKF.)*

AAZK, Inc. would also like to thank the Audubon Institute Chapter of AAZK (New Orleans, LA) for their donation of $500.00 in support of the Junior Zoo Keeper Program and for the publication of the *Junior Keepers' Forum*. [See related article on JKF elsewhere in this issue.]

SFCC Animal Technology Alumni Reunion

The Santa Fe Community College Zoo Animal Technology Program and Teaching Zoo will be celebrating its 25th Anniversary October 17-19, 1997. As part of the weekend events, an Alumni Reunion is being planned for October 17th. Activities will include lunch, dedications and tours of our new $1.7 million facilities. If you are an Alumni of the program and are interested in attending the Reunion, please contact us at: SFCC Zoo Animal Technology Program, Attn: Reunion Committee, 3000 N. W. 83rd St. Gainesville, FL 32606 or call (352) 395-5601 or e-mail at: jack.brown@santafe.cc.fl.us.

CORRECTION: In the June 1997 issue of *AKF* under Chapter News (pg. 276), the Pueblo Chapter's Conservation Parking Meter was noted as having been sponsored by the Woodland Park Zoo, Seattle, WA. In fact, the Meter was sponsored by the Puget Sound AAZK Chapter which is located at Woodland Park Zoo. We apologize for this error.

JUNIOR KEEPERS' FORUM

Many of you have helped promote the Junior Keepers' Forum both physically as well as financially and we would like to express our thanks. Our latest support comes from a gracious donation of $500.00 from the Audubon Chapter, AAZK. This Fall marks the one year anniversary of the JKF. This publication could never have become a reality without the generous support of the Association's chapters. Thanks for all of your help!

We are pleased to announce that the JKF has brought in over 120 new members to date. Because of this success the Board has voted to continue the JKF through 1998, increasing the number of issues from four to six per year. As this publication continues to grow AAZK, Inc. has the potential to reach hundreds of young children, educating them about animals, conservation and the zoo keeping profession.

If you would like to contribute to the JKF, we are soliciting for short (1-2 paragraphs) factual articles about any animal (from mites to whales!). We are also looking for any new exhibit information, rare animals in collections or conservation programs at your zoo. (Kids always enjoy hearing about an animal with a special talent, too.) Photographs are a plus and will be returned! Please submit any photos or articles to: Diane Callaway, Omaha's Henry Doorly Zoo, 3701 S. 10th St. Omaha, NE 68107. E-mail: dianec@omahazoo.com

Asian Elephant Donated to Portland Zoo

An orphaned female Asian elephant is being donated to Portland's Metro Washington Park Zoo by Enron Corporation which recently completed a merger with Portland General Electric. This contribution follows the recent establishment of a $25 million foundation in Portland by Enron and PGE to ensure continued support for Oregon communities and non-profit organizations. Enron has also sponsored a concert at the Zoo featuring the legendary Smokey Robinson with proceeds benefitting the Smithsonian Institution/Malayasian Program for the continued protection of endangered Asian elephants (the Malayasian Elephant Satellite Tracking Program).

It will be approximately 12-16 months before the calf arrives, at which time it is expected the current female cows will{adopt" her as one of their own. Rose-Tu, the zoo's youngest calf is being raised by her "aunties", 15-year-old Sung-Surin and 42-year-old Pet. The zoo keepers at Portland anticipate that Rose-Tu will benefit from having a playmate close to her age that comes from a more natural environment and has interacted with wild elephants. Zoo Director, Y. Sherry Sheng, noted that "a new elephant will strengthen and diversify the gene pool of our herd—a very important reason for this adoption." *—Enron News Release*

Conference '97 Reminders . . . .

Moody Gardens to Host Zoolympics

In association with the 1997 AAZK National Conference, Moody Gardens in Galveston will be hosting the Zoolympics event at out tropical Palm Beach facility. In addition to complimentary guided tours of our Rainforest Pyramid exhibit, we will offer AAZK package tickets which include a combination of IMAX-3-D movies, IMAX ridefilm, Discovery Pyramid and colonial Paddlewheel rides at a special reduced price of only $12.00 (reg. $22.00). For more information call Greg Whittaker at 1-800-582-4673, ext. 259; or for general information about Galveston Island's dining. lodging and tourist attractions, contact the Galveston Tourist Information Bureau at 1-409-763-4311.

Rhino Management Workshop Planned for Houston

We are organizing a rhinoceros management workshop for the AAZK Conference in Houston. We invite all interested parties to participate. One of the primary goals will be to compile and share information on different management tools and techniques. If you plan on attending, please bring information on: gestation length, pregnancy determination, labor duration and behavior, birth weights, neonatal morphometrics and physical appearance, calf health problems, weaning, and behavioral conditioning. Any other topics of interest are welcome for discussion. For further details contact: John Piazza or Lisa Fitzgerald, Dallas Zoo, (214) 670-6833; Fax (214) 670-6717 or via e-mail at dzconsrc@airmail.net.

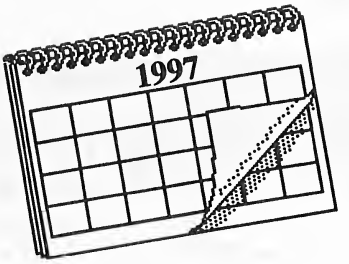
Enrichment Committee Seeks Workshop Topics

The AAZK Enrichment Committee would like your ideas and suggestions for topics to be addressed at the Enrichment workshop that will be held at the National AAZK Conference in Houston. The Committee will select several topics for an open forum discussion. Please contact any member of the Commitee via mail, phone or fax **prior to 30 September 1997** regarding your discussion topics. Members of the Committee are: Dianna Frisch, 7731 Whitneyway Dr., Worthington, OH 43085, (614) 785-9951, e-mail at dfrisch@aol.com; Kayla Grams, Arizona-Sonora Desert Museum, 2021 North Kinney Rd., Tucson, AZ 85743-8918, (520) 883-1380, Fax (520) 883-2500; Gretchen Ziegler, Sequoia Park Zoo, 513 K St., Eureka, CA 95501, (707) 441-4229, fax (707) 441-4237; or Lee Houts, Sacramento Zoo, 3930 West Land Park Dr., Sacramento, CA 95822-1123; phone: (916) 264-5166; fax: (916)264-5887.

Travel Information Available for Houston Conference

Continental Airlines will be handling travel arrangements for the 1997 AAZK National Conference. If you would like more information, please contact Susan or Barbara at AAZK Administrative Offices at 1-800-242-4519 (U.S.) or 1-800-468-196 (Canada).

Coming Events



Annual Conference of the Association of Zoological Horticulture - September 25 - October 1, 1997. For further information contact: Gary Outenreach, Horticulture Exhibit Manager, Moody Gardens, 1 Hope Blvd., Galveston, TX 77554 (800) 582-4673, ext. 271.

Association of Zoo Veterinary Technicians - September 27 - October 2, 1997, Asheboro, NC. Hosted by the North Carolina Zoological Park. For conference or membership information contact: Jenni Jenkins, LVT, AZVT Secretary, National Aquarium in Baltimore, Pier 3, 501 E. Pratt St., Baltimore, MD 21202, (410) 659-4256.

AAZK National Conference - October 5 - 9, 1997, Houston, TX. Watch the *Forum* for information or contact Christina Smith or Ric Urban at the Houston Zoo, 1513 N. MacGregor, Houston, TX 77030; (713) 520-3200.

Third International Conference on Environmental Enrichment - October 12-17, 1997 in Orlando, FL. For further information contact: Thad Lacinak, Sea World, Inc., 7007 Sea World Dr., Orlando, FL 32821 (407) 363-2651.

13th Annual Midwest Herpetological Symposium - October 17-21, 1997 at Shakopee, MN. Hosted by the Minnesota Herpetological Society. For further information contact: Bill Moss (612) 488-1383 or Liz Bosman (612) 476-0306 or e-mail MNHERPSOC@AOL.COM

American Association of Zoo Veterinarians Annual Conference - October 26-30, 1997, Houston, TX at the Sheraton Astrodome. For conference information contact: Dr. Wilbur Amand, VMD, Executive Director/AAZV, 6 North Pennell Rd., Media, PA 19063; Phone (610) 358-9530; Fax (610) 892-4813.

The 25th Annual Conference of the International Marine Animal Trainers Association - October 26-31, 1997 in Baltimore, MD. Hosted by the National Aquarium at Baltimore. For information, contact: Tim Sullivan, Brookfield Zoo, Seven Seas, 3300 Golf Rd., Brookfield, IL 60513: (708) 485-0263 ext. 464; Fax (708) 485-3532; e-ail: tsulli@manta.nosc.mil.

18th Annual Elephant Managers Association Workshop - November 1-4, 1997 in Fort Worth, TX. For further information contact: Steve Clarke, Fort Worth Zoo, 1989 Colonial Pkwy., Fort Worth, TX 76110; phone (817) 871-7415; Fax (817) 871-7012.

ChimpanZoo Annual Conference - November 15-19, 1997 in Little Rock, AR. For further information contact: Mark Hartmann, Ph.D., Dept. of Sociology/ Anthropology, University of Arkansas, 2801 So. University Ave., Little Rock, AR 72204; phone (501) 569-3176; or e-mail MAHARTMANN@UALA.EDU

18th Biennial Pronghorn Workshop - March 23-27, 1998. Hosted by the Arizona Game and Fish Dept. in Prescott, AZ. For information contact: 18th Biennial Pronghorn Antelope Workshop, Richard A. Ockenfels, Chair, P. O. Box 41716, Phoenix, AZ 85080-1716; Phone (602) 789-3379; Fax (602)789-3918; e-mail address is - rockenfels@gf.state.az.us

New Professional Members

Robert G. Lieb and Phil Reiser, **Bronx Zoo (NY)**; Sheila A. Wilbert, **Seneca Park Zoo (NY)**; Amy L. Negley, **Pittsburgh Zoo (PA)**; Debra H. Stofberg, no facility listed **(MD)**; Amy Myers and Jennifer Marie, **Baltimore Zoo (MD)**; Lucia F. Meeks, **Hollywild Animal Park (SC)**; David A. Hill, **Miami Metrozoo (FL)**; Marcia Henton Lewis, **Lowry Park Zoo (FL)**; Denise Chroninger, **Discovery Island (FL)**; Inez F. Libert, **Marion Nature Park (FL)**; L. J. Cory, **Disney Animal Kingdom (FL)**; Danny Allen Rose, **Municipal Black Bear Habitat (TN)**; Shari Ortez, **Detroit Zoological Institute (MI)**; Christine Smith, **Clinch Park Zoo (MI)**; Carol J. Kagy, **Milwaukee County Zoo (WI)**; Jennifer McDonald, **Grizzly Discovery Center (MT)**; Arthus Diaz, **Lincoln Park Zoo (IL)**; Heather Graham, **Glen Oak Zoo (IL)**; Marsha Fernandez, **Audubon Zoo (LA)**; Michael T. Brooks, **Safari's Zoo (OK)**; Keith Hudson, no facility listed **(TX)**; Kelly J. Reoh, **Houston Zoo (TX)**; Amanda Leverett, **El Paso Zoo (TX)**; Billy Day, **Utah's Hogle Zoo (UT)**; Liesl King, **The Phoenix Zoo (AZ)**; Susan Blair Buckley, **Wildlife West (NM)**; Tina Nuss, **Six Flags California (CA)**; Leticia Plasencia, **San Diego Zoo (CA)**; Linda Nickel, **San Francisco Zoo (CA)**; Mary Carlson, **The Seattle Aquarium (WA)**; Bruce Michael Lawler, no facility listed **(WA)**; and Kim Gray, **Vancouver Aquarium (BC, Canada)**.

New Institutional Member

Beardsley Zoo, Bridgeport, CT

Need to Reach AAZK?

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1-800-468-1966 (Canada)
FAX: (785) 273-1980
or write
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Topeka,KS 66606-2066
U. S. A.

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By Diana Guerrero, Independent Behavior Consultant,
Ark Animals of California, San Diego, CA

COMMON TRAINING ERRORS 101: UnderstandingApplications of the Bridge and Bridging Criteria Part One: Overview

Improper bridging is one of the most common errors or area of confusion to new trainers. Since the parameters vary in how the bridge is used, between different facilities and their methodology, this can become difficult. What exactly is a bridge and how is it used?

A bridge is usually some sort of signal, usually auditory, that connects the primary reinforcer to a behavior. The bridge is first paired with the presentation of the primary reinforcer. It then becomes what is known as a conditioned reinforcer or secondary reinforcer. Once that association is formed/trained, it is then used to help condition (or train) behavior.

Sometimes the bridge is used as a secondary reinforcer AND for signaling the termination or successful completion of the behavior or task. Differentiating how to use the bridge can be hard for newer trainers and is sometimes confusing because the applications can vary from facility to facility; each trainer will also vary in their skill and applications.

Variations in bridging are found with each trainer and facility. separated. So, the bridge can be used as a source of feedback (as a secondary reinforcer). Used as feedback, the behavior or series of behaviors are reinforced by the bridge. When used this way, the behavior is not necessarily terminated with the presentation of <u>that</u> bridge.*

The bridge can be used to signal the successful completion of a behavior and as a release from further performance, in this case, it does signal the termination of the behavior or performance. When in doubt, keep it simple until you get the hang of it. That is, use the bridge as a message to the animal that they have performed correctly and will be rewarded. This IOU, when applied correctly, will build confidence in an animal and avoid confusion.

Normally a bridge is used to reinforce the best response or peak of a behavior. Your criteria for a behavior should be well defined and CONSISTENT. The fastest, best responses are what you will want to reinforce. Also, the bridge is a communicator to the animal to let them know if they have reached that desired performance level and/or are finished with the trial or session.

Types of bridges can vary, sometimes the bridge is a word, a whistle, a tone, or a clicker. It can also be a flashing light or another visual signal. Bridges can also vary in length of presentation and in their placement. The best placed bridge, for reinforcement, is at the peak of the performance.

With all these variables to consider, it can get really confusing. The important thing is to be careful with how you use the bridge and to apply it consistently to the animal. Here is where things get confusing and more complicated.

Each trainer will vary in their approach and manner of bridging. What is important is that some consistency and clarity be presented to the animal working for the trainer. Yes, animals do differentiate between trainers and what they can get away with. Opportunistic critters will also "train the trainer" or manipulate a newer trainer. Good enrichment for the animal but frustrating for the trainer!

Weekly or daily meetings between trainers are critical to successful training if you all work the same animals. It is easier for the animal to have one consistent trainer, but due to staffing constraints and variables in the work force, this is almost impossible to do. Clear communication between training staff members will improve the standardization and consistency of approach for everyone involved.....and cut down on frustration of both the animals and humans.

Simply put, the bridge is a communication tool. If you find that a certain application works better than another —go with it. Where things get more complex is when there are a lot of trainers and animals with their own styles and nuances.

Remember that good training is both art AND science; it is integrating what you know, with skill developed over time and experiences with different situations and animals, that will make you a good trainer. Remember, in a perfect world, clear communication and parameters can overcome any confusion or debate over the bridging topic.

*Advanced techniques can get complicated and confusing. That is for another article!

Next Month: Part Two: Questions From Bridging Article

If you would like to submit a behavior question/scenario for discussion in this column, please use the guidelines published in the Aug. 1997 AKF (pg. 348-350). Requests for behavior evaluations should be sent to Diana Guerrero at Ark Animals, Inc., P. O. Box 1154, Escondido, CA 92033-1154 or directed to her e-mail address listed on the following page.

About the Author: Since 1978 Diana has been active both in the U. S. and England working with zoos, private collections, an oceanarium, a marineaquarium, and other animal-related organizations involving captive wildlife. She has a broad base of animal experience involving movie & television training, zookeeping, show performances with live animals, education, behavior management, modification and enrichment, rescue and rehabilitation as well as captive breeding and management of endangered species. She is currently working as an Animal Behavior Consultant and Trainer with both exotic and domestic animals, she has authored numerous articles on animal behavior and training. If you have questions for Diana, you may contact her at 1-800-818-7387 or via the email listed below. ***NOTE****: The Ark Animals' Website has completed the change to Electronic Magazine Format. The "Ezine" features articles related to captive animal behavior, enrichment, conservation, and similar topics. The publisher welcomes electronically submitted articles (previously published or new work). Deadline is the 10th of the month previous to publishing. Interested parties may contact the publisher at arkabc@arkanimals.com Site address is http://www.arkanimalS.com*

Consumers Beware . . .

Ivory Imports Into U.S. Still Illegal

Tourists who are planning to travel abroad should take note: all imports of ivory into the United States are prohibited under the Endangered Species Act and the African Elephant Conservation Act except:

o Bona fide antiques more than 100 years old, which can be imported for any purpose with a valid permit;

o Personal and household effects of African elephant ivory registered with U. S. Customs upon exportation and now being re-imported; and

o African elephant ivory items acquired for non-commercial use prior to February 4, 1977 (first listing under CITES), when accompanied by a valid special pre-convention permit.

A recent decision to relax some trade controls for African elephants does not change these restrictions on ivory imports into the United States. Under this decision, taken at the June 1997 Conference of the Parties to the Convention on International Trade in Endangered Species (CITES), elephant populations in Botswana, Namibia, and Zimbabwe will be downlisted from the treaty's highest level of protection, Appendix I, to Appendix II, which allows the possibility of international commercial trade under a system of permits. The downlisting becomes effective September 18, 1997.

Elephant populations of the 34 other African elephant range countries remain

on Appendix I, as does the Asian elephant. All populations of African elephants remain listed as threatened under the U.S. Endangered Species Act, with Asian elephants listed as endangered.

If Botswana, Namibia, and Zimbabwe fully satisfy conditions designed to protect elephants against poaching and illegal trade and ensure the health of wild populations, a limited international trade in raw ivory may be resumed beginning March 18, 1999. At that time, the three countries will be allowed to export an experimental quota of raw ivory only to Japan, which has a traditional domestic market for ivory. This trade will be closely monitored and, as an additional safeguard, Japan will prohibit export or re-export of any ivory for commercial purposes. If these conditions are not met or if illegal hunting of elephants or trade in elephant products escalates, the three elephant populations can be returned to Appendix I.

The three countries also agreed to direct all net profits from the sale of this ivory into African elephant conservation through enhanced monitoring, research, law enforcement, and more support for community-based management programs.

Even if this extremely limited trade is permitted, the importation of ivory into the United States is still banned. Some limited exportation of souvenir ivory carvings was approved for Zimbabwe, but these items may not come in to the United States. Any ivory purchased abroad (other than properly documented antiques) could be confiscated upon importation into this country. If your purchase is seized by Customs or wildlife inspectors, you will not be refunded the purchase price and you might be subject to monetary fines.

from U. S. Fish and Wildlife Service News Release, July 31, 1997 Patricia Fisher , (202) 208-5634

Baltimore Zoo Reports First N. A. Breeding of Tomato Frogs Without Use of Hormones

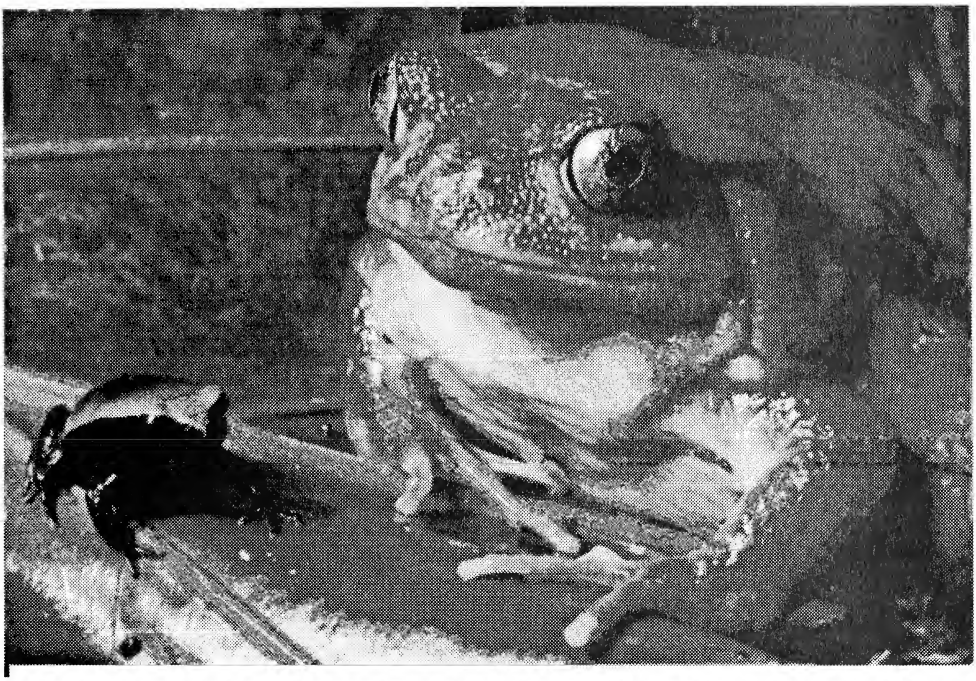
The Baltimore Zoo's Herpetology Department has successfully bred the endangered Madagascar tomato frog (*Dyscophus antongilli*), becoming the first North American Zoo to breed this species solely through environmental manipulation, without administering hormones.

Deforestation and over-collection for the pet trade have threatened the stability of the tomato frog population in its native Madagascar to the extent that it is now listed as an endangered species. The captive population in U. S. zoos - currently 101 adult specimens in 21 zoological institutions - is also jeopardized by a lack of genetic diversity, unknown pedigrees, and until recently, a shortage of animals.

In an effort to preserve the species in captivity, the Baltimore Zoo spearheaded a collaborative effort in 1994, sending tomato frogs from four U.S. zoos and two private collections to the University of California at Berkeley. There, under the direction of Dr. Dale Denardo, the UC/Berkeley team successfully produced young using hormanes. The Baltimore Zoo received a group of 14 tomato frogs from the project in Decemberof 1994, and following an initial attempt last year, became the first zoo to breed the frogs by manipulating their environment using precise temperature, humidity, and photoperiod alternatives to simulate the tomato frogs' natural seasonal cycles. These environmental cues initiated reproductive behavior without the use of hormone injections.

"It is primarily an animal health issue," said Anthony Wisnieski, Curator of Repriles and Amphibians at Baltimore. "Giving hormones to an animal to induce breeding can sometimes have adverse side effects. If you can duplicate the environmental changes that trigger reproduction in the wild, breeding in captivity becomes a much more natural process and a lot less can go wrong. Our amphibian keeper, Erik Anderson, did an excellent job in producing the right combination of these changes - the frogs responded as they would have in their natural habitat. This is a very good indication that we have met one of our most important goals--creating a captive environment for our animals that is as close to their natural one as we can make it."

To educate the Malagasy people on the plight of this endangered species and to combat the challenges of insufficient genetic diversity in the captive U. S. population, the Baltimore Zoo has funded the construction of a tomato frog exhibit in Parc Zoologique, a zoo in Madagascar. This was accomplished by working through the Madagascar Fauna Group - a consortium of U. S. zoos which are dedicated to the preservation of the threatened fauna and natural habitats of this unique island country. Significantly, this is the first and only exhibit for an amphibian species in all of Madagascar. It features eight wild-caught tomato frogs that zoo keepers will attempt to breed so that offspring may be available to zoos abroad, which are in desperate need of new bloodlines.



Madagasca tomato frog (*Dyscophus antongilli*) **from the Baltimore Zoo is pictured at right.** *(Photo provided by the Baltimore Zoo Marketing Dept.)*

Photographs of the Baltimore Zoo's tomato frogs have been provided for the educational graphics at the new Parc Ivoloina exhibit. The graphics will help educate the public about the preservation of this endangered species and its habitat, as very few people in Madagascar are aware of the threats to its survival.

Additionally, the Baltimore Zoo has provided funding for Dr. Edward Louis of Omaha's Henry Doorly Zoo to perform DNA testing on blood samples taken from tomato frogs in U.S. zoos with unknown pedigree. "This will enable us to determine exact lineage for all captive tomato frogs, so that we can breed pairs that provide maximum genetic diversity in the zoo population," Curator Wisnieski said. To that end, the Baltimore Zoo is also working towards exchanging tomato frogs with the Copenhagen Zoo - so that European and U.S. institutions may benefit from the shared bloodlines.

The Baltimore Zoo's froglets are currently only a half-inch long and have a light brown skin color. Adult tomato frogs range from three to four-inches with females being slightly larger. The froglets will acquire their distinctive tomato-red coloring in several months. This bright coloration serves as a warning that distasteful toxins are secreted as a natural defense against snakes, small mammals and predatory birds. The Baltimore Zoo's total number of tadpoles produced through environmental manipulation is upwards of 4,000, an impressive success rate.

--excerpted from Baltimore Zoo Press Release of 7/23/97

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"INK FOR INC."

Growth is a funy thing.

We, in the care business,probably know it best of all. Growth depends on a number of things—among them, favorable conditions and adequate nuturing. It takes time and attention. Whether it is captive management at a zoo or aquarium, or attention and concern for *in situ* wild species and their habitat, life on the line is a substantial part of our experience and our interest as zoo keepers. Through our work, these are things that we genuinely care about. Through our own expereinces will come our own professional growth. We become better and we do better.

The organization that, for many of us, has provided an avenue for this stimulus and growth, is AAZK, Inc. It has provided those essential things - conditions, nurturing, time and attention through the actions of its Board of Directors, staff, committees, officers, Chapters and members. AAZK exists only because the above mentioned groups and individuals sustain and support it to various degrees. Conversely, the above mentioned 'community' exists only because the idea of AAZK, Inc. has created those opportunities for them.

But, where it had provided the foundation for existence and opportunities for growth and nurturing, this Association itself had suffered its own troubles in maintaining its needs for sustainability and health.

A number of months ago, an appeal went out to Chapter and members to help AAZK, Inc. The Association needed a portion of Chapter financial resources, above the mandatory recharter fee, to help sustain the organization. (AAZK does receive support through donations from concerned Chapters on a regular basis.) The responsewas overwhelming and gratifying to see. To date AAZK Chapters have donated over $8100.00 in direct donations for various uses ranging from the general operating fund to the Jr. Zoo Keeper program. As well, the Board has made critical moves to reduce spending and to budget more prudently. This has meant deletion or reduction of some committees, projects, practices and spending.

Since this response, the American Association of Zoo Keepers, Inc. has made a encouraging recovery and, as L.I.N.K Coordinator, I would like to say a very heartfelt thank you to all who have helped make this so. To tell the truth, I am very moved. I have been a member of this organization for almost 20 years and I care about it alot. To see this care demonstrated by the membership makes me believe that not only do we grow upward and onward, but also within.

Sincerely,

Mark de Denus

Mark de Denus
L. I. N. K. Coordinator/AAZK, Inc.

Great Lakes Regional Council Meeting Report July 22 - 23, 1997

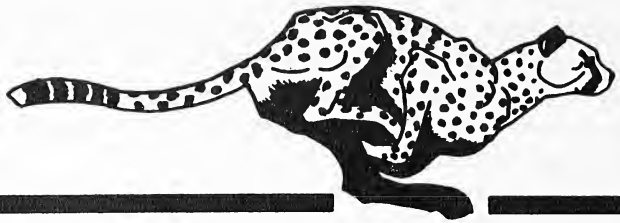
submitted by Wayne Hazlett, Assistant L. I. N. K. Coordinator

The Summer Regional Meeting was blessed with two fine days weather-wise, as well as a nice attendance figure of over 45 people. Seven wildlife facilities were represented, with delegates from four states (Indiana, Illinois, Wisconsin, and Minnesota). Ohio, Michigan and Kentucky did not send delegates and their input was missed. Lake Superior Zoo in Duluth, MN (not presently in this Council) sent five delegates. Racine Zoo, Willie's Wildlife, and the Milwaukee County Zoo represented Wisconsin; while Miller Park Zoo and Phillips Park Zoo represented Illinois. The Potawatomi Zoo in South Bend, IN represented that state.

On Tuesday, tent camping was available as well as an excellent BBQ dinner in the evening. The menu featured bratwurst, chicken breast, hamburgers, and Saz's famous barbecued pork. Of course salads, fruits and veggie trays topped it all off. In the evening, Dr. John Scheels, DDS, presented a very interesting slide program on "An Overview of Captive Animal Dentistry". Following the lecture, Clay Ecklund of the Milwaukee County Zoo gave a slide presentation on his recent work with the "Peruvian Primate Census Project Keeper Participation Program".

The Summer Regional Meeting following the slide lectures with Animal Training/ Conditioning as the theme of the meeting. Fundraising was also a subject of discussion with many ideas shared by those in attendance. It was proposed to either add the State of Minnesota to the Great Lakes Council, since they are on the Great Lakes, or replace Kentucky with Minnesota, since they are not on the Great Lakes. This issue will be discussed further at the meeting in Houston.

The next morning, the delegates met once again at the campsite for a light breakfast. Zoo tours were conducted all day by Milwaukee County Zoo AAZK members. The Milwaukee Chapter members would like to thank all the delegates to the 1997 Summer Regional Meeting. We enjoyed having you visit our zoo.



REACTIONS

A Question and Answer Forum for the Zoo Professional on Crisis Management

By William K. Baker, Jr., Zoologist
Lufkin, TX

QUESTION

Are there any non-lethal options other than using a dart rifle for animal escape situations?

COMMENTS

The method most commonly used in the zoological industry for the capture or immobilization of an animal is the dart rifle. While the delivery system may vary, the basic design is the same. A dart loaded with a chemical agent is used to immobilize the animal. However, situations may arise where this may not be the best option for animal managers to use for recapture. Examples of this would be:

1. Available staff members may be unfamiliar with the mechanics of loading a dart.

2. Available staff may be unfamiliar with the technical aspects of chemical agents, dosage levels, and how to mix separate agents into a "cocktail".

3. The physical size of an animal might restrict darting. This would most likely occur when dealing with reptiles, smaller mammals, and smaller primates.

4. The animal has no personal or species history of serious aggression. In other words, the animal has a non-threatening disposition.

NON-CHEMICAL RESTRAINT TECHNIQUES

1. Physical Restraint - This is a technique that should be used sparingly or avoided altogether. Its best application is for small docile animals. The likelihood

of bites and scratches is high. Consequently, gloves or gauntlets should be worn.

2. Rope Restraint - Simply put, multiple staff members lasso an animal with ropes to restrict movement. This is neither simple or easy to do. Lassoing is a skill that takes considerable practice and can be dangerous to all parties.

3. Field Hooks - Commonly referred to as "snake hooks". This is used to direct movement or restrain a reptile. This is definitely a technical skill that takes considerable practice. Special care is required for venomous reptiles.

4. Pole Noose - A pole that is constructed of either fiberglass or aluminum. The head is equipped with a noose that is released and controlled by the operator. Size and composition is determined by intended use and species.

5. Control Poles- These come in two styles. One, the fiberglass style , is used for directing movements of livestock. Two, the fiberglass or aluminum style with a flexible triangular head, is used to direct and restrain exotic wildlife.

6. Pole nets - This would be the most common capture net seen in zoological institutions. Pole nets come in a variety of sizes and meshes which are dependent on the size, type, and weight of the animal. Options include cord-locks, grips, extensions, and pole composition.

7. Cast Nets - Basically a circular net that is tossed by hand over an animal. The net works by enveloping and fouling the animal into a prone position on the ground. Needless to say, this takes a great deal of practice to master.

8. Mist Nets - These are ultra-fine mesh nets that are typically strung between two objects. The net is nearly invisible at even a short distance. The animal either flies or runs into the net and is entangled.

9. Drop nets - These are heavy grade mesh nets that are either dropped over a target area or delivered by a ground fired cannon system. They are especially useful in catching large groups of animals over a baited area.

10. Net Guns - Essentially these are rifles that have been modified to fire a projectile net over considerable distance. They are typically offered in two models, air to ground capture and ground capture.

11. Live Animal Traps - These are available in a large variety of sizes and styles. Use is dictated by the size, species, and weight of the animal to be captured. The downside is that the animal has to find the trap and bait.

12. Directed Visual Barriers - The key is to use a barrier that is solid in appearance, lightweight, and supported at intervals so that someone can hold it up or ground mount it. Effective barrier materials include canvas, plastic, shadecloth, and metal shields. This is a very effective technique for directed movement of animals.

CONCLUSION

There is a incredible diversity of equipment available for the zoological professional to use in an effort to capture an animal. Each has its own associated strengths and weaknesses that will dictate which is the best option for the task at hand. The limiting factors will always be behavior, size, species, weight, and relative danger. Multiple animals will require a different capture strategy than the ones used for single animal capture. If the methodology in current use works, then stay with it. If not, change the strategy.

NEXT MONTH: Do colognes and perfumes effect the behavior of captive animals in a negative way and pose a threat to personal safety?

If you would like to submit a question for this column or have comments on previously published material, please send them to: Reactions/AKF, 635 S. W. Gage Blvd., Topeka, KS 66606-2066.

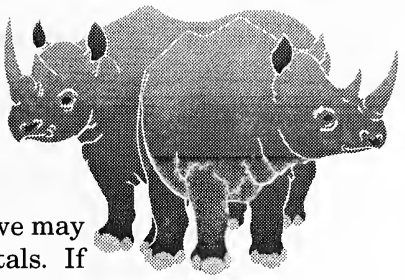
(About the Author: Since 1985 Bill has been active in the fields of sceence, zoology and wildlife management. His education and expereince include a B. S. in wildlife management and post-graduate work in zoology; Lab and Museum Assistant; Shoot Team leader, ERT Member, and Senior Keeper and Large Mammal Keeper at various AZA facilities. His area of research is crisis management in zoological institutions, which draws upon practical experience and training as a Rescue Diver, Hunter Safety Instructor, NRA Firearms Instructor, and Red Cross CPR / First Aid Instructor.)

AZA Western Regional Conference - 11-14 March 1998 - Monterey, CA. For further information, contact Ginger Hopkins, Monterey Bay Aquarium, 886 Cannery Row, Monterey, CA 93940-1085 (408) 648-4925.

AZA Central Regional Conference - 1-4 April 1998 - Grand Rapids, MI. For further information, contact Brenda Stringer, John Ball Zoological Society, 1300 W. Fulton St., Grand Rapids, MI 49504-6100 (616) 336-4301.

AZA Eastern Regional Conference - 22-25 April 1998 - Boston, MA. For further information, contact Elizabeth Coleman, New England Aquarium, Central Wharf, Boston, MA 02110-3399 (617) 973-4925.

Bowling for Rhinos Update



submitted by Patty Pearthree
Bowling for Rhinos National Coordinator

Please send in your 1997 event money ASAP so we may include your Chapter/Institution in our 1997 totals. If you are waiting for a few stray checks, send what you have and then I can always add the rest later. If you have any questions about "Bowling for Rhinos", please contact: Patty Pearthree, P. O. Box 199026, Indianapolis, IN 46219-9026, call (317) 322-8723 or e-mail ppear3@aazk.ind.net. You can also get info on the AAZK Web Page - http://aazk.ind.net.

Indonesia Trip

I was able to visit Ujung Kulon (Java) and Way Kambas (Sumatra) for three weeks in June/July of this year. The trip was funded through a grant awarded to the Minnesota Conservation Officers by "The Rhino & Tiger Conservation Fund" (U. S. Fish and Wildlife Service). This was a joint effort by the Minnesota Conservation Officers, AAZK and Safari Club International with eight individuals representing these groups. We also had an interpreter with us who was extremely helpful as very little English was spoken.

Part of the group was involved with training of park guards in handcuffing, use of knives and general self-defense techniques. Prior to this training, guards would have to convince a poacher to follow them through the forest to be arrested at the park headquarters. Many village children watched in amazement as the park guards learned how to get a man twice their size pinned to the ground and handcuffed with ease. It was incredible to see how much self-confidence the park guards gained in apprehending poachers. It was thrilling to see the excitement the guards showed with this new training that will make their lives much easier and safer. The Safari Club International supplied the guards with handcuffs, GPS equipment, compasses, field glasses, first aid kits, rain gear, and other much needed equipment. The children also took home the message that the guards are well-trained and equipped now, so watch out poachers!

I was a part of the Education Group. We were assigned the task of finding out if park guards could come to the schools to teach conservation education (i.e. set up an "outreach" program). We also wanted to find out if we could set up a program for Indonesian school children allowing them to communicate with American school children. We visited several private and public schools surrounding each park. One village to which we traveled by jeep, motorcycle and then on foot was on the far east side of Ujung Kulon and was called Cegog. Villagers told us they had only seen one white man in the last 50 years, and had never seen a white woman until now! We then hiked back to camp by climbing over a mountain range to the coast again.

Anna Mertz was visiting Ujung Kulon at the same time so I was able to squeeze in a day of hiking with her looking for Javan rhino. A few days later, Anna was successful in finding the rhino, giving her the thrill of a lifetime.

Not all of the trip was as pleasurable. I spent an hour barefoot on a maggot-infested beach which was the village garbage dump. The ocean water was as thick as pea soup. We knew it was raw sewage as we could see the ditch running from the village into the water a few feet from where we stood. We had to wade out to a dugout canoe to take us to a larger boat. Our legs stung as we sat in the boat and we wondered what illnesses were in store for us. The smell was so strong and the scene so disgusting that, if I had been alone, it would have been easy to vomit. The great group I was with made everything bearable, interesting, and even enjoyable.

The village children swam in the midst of all of this pollution. It made me happy to be an American knowing we would never tolerate such contamination. Indonesia is just beginning to see they have a pollution problem. The smog in Jakarta was much worse than any problem I have ever see in Los Angeles. It is easy to see that conservation education is critically needed in Indonesia.

I stayed on an island where rats were the most common wildlife, and fell asleep to the sound of grown men acting like 12-year-olds, laughing and jumping from bed to bed trying to chase the rats with a flashlight. I also stayed at Peucang Island which caters to tourists with air-conditioned rooms, real showers (other places were a cup and a bucket of water), and meals were something other than fish and rice. The only wildlife we were bothered by here was the macaques that were so bold they would jump onto the dinner table or steal items from your room while you were in it!

At Way Kambas we were visited by wild elephant during the night and every morning I awoke to the songs of gibbons and siamangs. I hiked to a camera census site which has allowed photos to be taken of many Sumatran tigers, elephants, sunbear, civets, tapirs, etc. Often the photos (which have time and date) show tigers visiting the site within minutes of people changing film, hiking, etc.

Another very rewarding part of the trip was be able to attend "The Javan Rhino Colloquium" which was held in Bogor the first three days of our trip. This meeting brought together 40 people from all around the world to meet and find out who was doing what for Javan rhino conservation. We discussed the needs of Ujung Kulon, prioritized these needs, and tried to determine who would fund different projects. We learned of the work being done in Vietnam where it is believed 15-20 Javan rhinos still exist. Although I would always rather be trekking in the jungle, this was the most important and informative meeting I have ever been able to attend. I was able to see how Bowling for Rhino funds could best be used within the parks. I was truly honored to be invited and was glad that I could represent AAZK and bring home information which I will share next month with delegates at the Houston AAZK Conference.

Display Behavior and Breeding Biology of Caribbean Flamingos (*Phoenicopterus ruber ruber*)

By
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Abstract

Flamingos are common in zoos yet remain relatively unstudied by zoo biologists. This is striking, given that flamingos tend to breed poorly in captivity and that there is little published literature on the behavior of individually-marked flamingos in the wild. This study sought to determine if there were differences between male and female flamingos in display behavior. Display bouts and their component display actions were recorded from a captive flock of 75 individually marked Caribbean flamingos over a period of three months in 1993. Data were then analyzed to determine if there were gender differences in display behavior with regard to number, rate, and length of display bouts, use of specific display actions, and display action sequence. Males were found to be more likely to engage in display behavior. When bouts by juveniles were excluded from the data set, female display bouts contained significantly more display actions. Male and female display bouts also differed in sequences of display actions used. Other aspects of the breeding biology and social behavior of flamingos are discussed.

Keywords: Displays, *Phoenicopterus ruber ruber,* reproductive condition

INTRODUCTION

Lack [1968] originally reported that as many as 90% of bird species may be monogamous; however, numerous systematic studies of behavior and paternity have determined that many bird species thought to be monogamous actually exhibit polygynous or polyandrous mating systems. Flamingos have been described as monogamous and do show high levels of pair fidelity in captivity [Pickering, 1992; Stevens et al., 1992], but some studies of captive [Bennett, 1987; King 1994] and wild flamingos [e.g. Cèzilly and Johnson, 1995] have shown evidence of extra-pair sexual behavior and low levels of mate fidelity.

Ritualized display behavior has been described in a number of species and has been hypothesized to attract a mate or increase a female's readiness to mate. In general, males perform the majority of display behavior and may be more brightly colored than females or larger in body size. Sexual dimorphism in display behavior may be related to breeding system; therefore, I thought that a quantitative analysis of the display behavior of flamingos might help to clarify the nature of the flamingo breeding system. If display behavior serves the purpose of mate attraction or advertisement, then differences between the sexes in display behavior would be expected if the sex ratio is skewed, leading to competition among members of one sex for access to members of the other sex. However, if display behavior does not serve this function, but rather is used as a cue to prime birds for reproduction, then no differences

between the sexes would be expected. I would also expect there to be no differences in display behavior if the sex ratio in the flock was approximately equal.

In flamingos, it has been hypothesized that display behavior helps to bring the birds into reproductive condition quickly by stimulating pair formation and nest building [Ogilve and Ogilve, 1986; Studer-Thiersch, 1974] so that they can take advantage of rainfall when it occurs. Rainfall is thought to be important for flamingo breeding because it facilitates construction of mud nest mounds and increases proliferation of crustaceans, algae, and unicellular organisms which are eaten by the flamingos. High water also provides increased predator protection for the nest area [Ogilve and Ogilve, 1986].

The current study sought to determine if there were any differences in the display behavior of male and female Caribbean flamingos (*Phoenicopterus ruber ruber*) with regard to: (1) likelihood of displaying, (2) number, rate, and length of display bouts, (3) use of specific display actions, and (4) display action sequences.

METHODS

Study Flock

The 75-member flock of Caribbean flamingos at Parrot Jungle and Gardens (Miami, Florida) was studied in February, March, and April of 1993, prior to and at the beginning of the breeding season for this flock. This flock had reproduced in the past but with a low rate of success. The flock was composed of juveniles and adult birds aged five months to 41 years with a sex ratio of two adult males per adult female. Fifty-five birds were sexually mature during this study (36 males, 18 females, 1 unknown sex). Each bird was marked with a colored, numbered leg band for identification. The flamingos were housed in a large outdoor enclosure with a pond at its center. There is a permanent nesting area in the exhibit. Each year during late April to mid-May, a portion of the exhibit was plowed and mud nests were started for the flamingos. This area was adjacent to the pond and periodically was moistened by an irrigation system.

Data Collection

The group display repertoire of Caribbean flamingos is composed of six display actions: head flag (HF), wing salute (WS), inverted wing salute (IV), twist preen (TP), wing-leg stretch (WLS), and marching [see Studer-Thiersch, 1974, for descriptions]. Marching behavior has also been described in flamingos; however, this behavior was not scored because when birds marched, it was impossible to record the identities of all of the marching birds and including this behavior may have produced a bias in the data set. All flock members were observed and any time a bird displayed, the sequence of display actions was recorded as well as the sex of the displaying bird [behavior sampling with all occurrences recording: Altmann, 1974]. Observations were conducted during all hours that the park was open. Display actions were considered to be part of the same display bout until the interval between successive actions exceeded 10 seconds. Each display action took less than one second to complete therefore an interval of 10 seconds between actions was considered a separate display bout. All individuals in the flock were visible at any given time and were thus assumed to have been sampled equally.

Analysis

A G-test was used to determine if participation in display behavior was contingent on sex [Sokal and Rohlf, 1981]. A rank sum test [Welkowitz et al. 1982] was used to determine if males and females differed significantly in overall use of individual display actions, overall number of bouts, rate of display bouts (bouts/minute), and number of display actions per displaying bout. The data set was first analyzed using all of the displaying bouts recorded, and was then re-analyzed after those displaying bouts by sexually immature (under three years of age, Kear and Duplaix-Hall, 1975) birds were removed. For all statistical tests, significance was assigned when $p<.05$. Phase diagrams of display action transitions were constructed in order to analyze the likelihood of specific display sequences and to determine if males and females differed qualitatively in display action sequences. In order to determine if any birds contributed significantly more display bouts than other members of their sex, z-scores were calculated [Sokal and Rohlf, 1981].

RESULTS

A total of 210 display bouts were recorded, containing 411 display actions. Two birds (one male, one female) contributed significantly more display bouts than other members of their sex. The male's displays accounted for 12.6% of the display bouts recorded from males; the female's displays accounted for 18.6% of the display bouts recorded from females. The displaying bouts of these two birds were not qualitatively discernable from displaying bouts of other birds in the flock; therefore, all of their display bouts were used in the analysis. These two birds appeared to be a mated pair that were dominant to other members of the flock.

Sex influenced the likelihood of engaging in display behavior when all display bouts were analyzed ($G=3.869$, $p<.05$) and when display bouts of juvenile birds were excluded from the data set ($G=23.416$, $p<.001$). In both cases, males were more likely to display than females.

When display bouts by immature birds were included in the data set, no significant differences between males and females were found in any of the measures tested (Table 1). When those bouts by immature birds were removed, female display bouts were found to contain significantly more display actions than were male bouts though this difference is borderline significant ($z=-1.963$, $p<.05$; Table 2). Male display bouts contained an average of 1.92 actions (range 1-6) while female bouts contained an average of 2.20 actions (range 1-6); however, 50.2% of the displaying bouts recorded in this study contained only one display action (49.6% of male bouts and 51.7% of female bouts). Experiment wise error levels were not controlled for in the statistical analysis; if they had been controlled for, no significant differences would have been found between the sexes for any variable regardless of the data set used.

Twist-preening was the most commonly used behavior in both sexes (Tables 1 & 2). In male displaying bouts, all display actions, except for head flags, were most commonly followed by a twist preen (Fig. 1) and twist preens were usually followed by an inverted wing salute. In most cases, head flags were the first display action in a display bout and were most often followed by a wing salute (Fig. 1). Therefore, a typical sequence for males might be HF→WS→TP→IV→TP or WLS→TP→IV→TP.

Female flamingos also commonly interspersed wing salutes, wing-leg stretches, and inverted wing salutes with twist preens (Fig. 2). Twist preen'inverted wing salute sequences were more common in females than in males, while wing-leg stretch'twist preen sequences were less common. Inverted wing salute'wing-leg stretch sequences were also fairly common in females (Fig. 2) and very uncommon in males (Fig. 1). Head flags were very rarely used by females (Table 1). A typical display sequence for females might be WS→TP→IV→TP or WS→TP→IV→WLS→TP.

DISCUSSION

Table 1: Display behavior characteristics of male and female Caribbean flamingos, sexually immature birds included.

Variable	Males	Females
Average # of:		
Bouts/individual	3.87	2.81
Display actions/displaying bout	1.73	1.87
Display bouts/minute	0.005	0.004
Head flags/individual	0.62	0
Wing salutes/individual	1.21	0.76
Inverted wing salutes/individual	1.03	1.29
Twist preens/individual	2.77	2.05
Wing-leg stretches/individual	1.77	1.71

Table 2: Display behavior characteristics of male and female Caribbean flamingos, sexually immature birds excluded.

Variable	Males	Females
Average # of:		
Bouts/individual	4.3	3.58
Display actions/displaying bout	1.77	2.48*
Display bouts/minute	0.005	0.004
Head flags/individual	0.73	0
Wing salutes/individual	1.3	1.17
Inverted wing salutes/individual	1.18	2.17
Twist preens/individual	3.18	3.5
Wing-leg stretches/individual	1.82	2

*$p<.05$

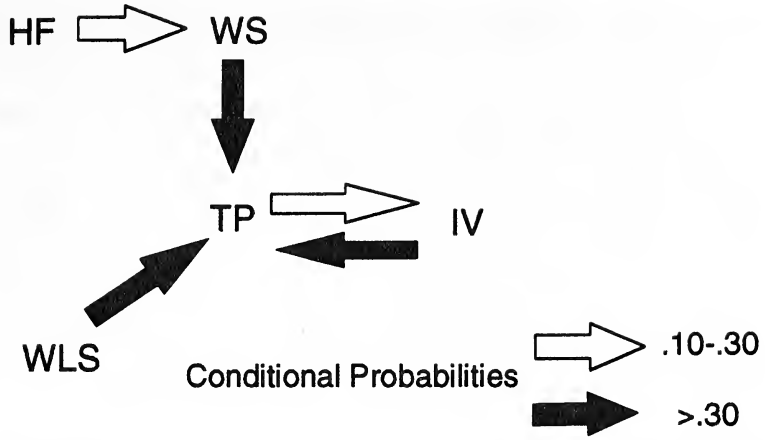


Fig. 1. Phase diagram of display transitions in male flamingos. Color of arrow represents the relative probability of that transition occurring. Only those transitions with at least a .10 probability are shown.

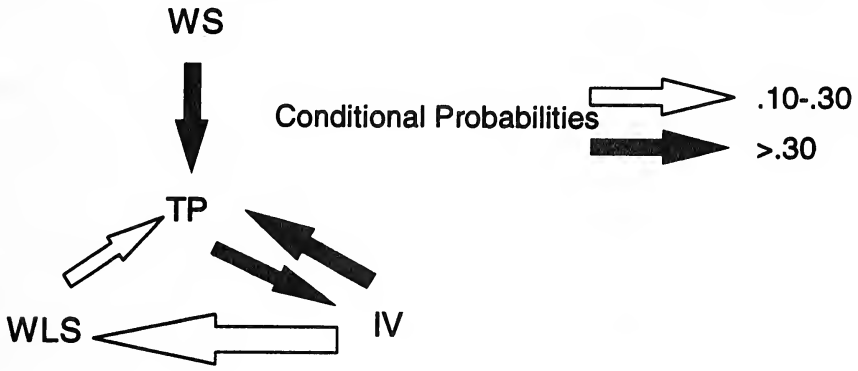


Fig. 2. Phase diagram of display transition in female flamingos. Color of arrow represents the relative probability of that transition occurring. Only those transitions with at least a .10 probability are shown.

Male and female flamingos did differ in several aspects of their display behavior. Males were more likely to engage in display; however, female displays contained significantly more display actions per bout and were thus more protracted than male display bouts. Studer-Thiersch [1975] reported that display bouts in greater flamingos (*Phoenicopterus ruber roseus*) typically contained 2 to 4 actions and that sequences of 4 actions are more common in Caribbean flamingos, especially among females. Rooth [1965] found that the duration of male displays was longer than the duration of female displays. In the current study, males and females did not differ in the average number of display bouts per individual, though they did differ in the likelihood of displaying. In other words, males were more likely to display, but displaying males and displaying females gave equal numbers of displays. The finding female display bouts contain more display actions may indicate that female displaying bouts contain more detailed information about reproductive condition and/or readiness to mate.

Both sexes used display actions in similar proportions and did not differ in the rate of their display behavior. Twist preens were the most common display action observed in the Parrot Jungle flock. In the Caribbean flamingo flock at the National Zoo, Stevens [1991] found that wing salutes were the most common display action observed in one season followed by head flags and twist preens which occurred with equal frequency. The following season wing salutes and head flags occurred with equal frequency and were significantly more common than other behaviors. These differences may be attributable to differences in sampling methods or to differences in observation periods. I recorded all instances of display behavior while Stevens [1991] used one zero sampling [Altmann, 1974] which does not measure the actual frequency of the behavior being observed. I began observing the Parrot Jungle flock in February and continued through mid-April while Stevens [1991] began observations in mid-April and continued through the end of May.

Among greater flamingos twist preens may be repeated several times in a displaying bout [Studer-Thiersch, 1975]. The same was true for Caribbean flamingos in this study with two or three repetitions being most common. Studer-Thiersch [1975] also found that wing salutes and inverted wing salutes generally occurred only once within the same display sequence and that wing leg stretches may be performed twice. He also reported that display actions generally do not occur alone. In my study, wing salutes usually occurred only once in a sequence, though inverted wing salutes were more likely to occur twice. Wing leg stretches were most often performed alone; however, when they were combined with other display actions in a displaying bout, wing leg stretches occurred twice. The functional significance of differential use of display actions and their sequence is not clear, but it may be related to information coding. Displays may vary in composition and sequence in order to convey different messages about the signaler's reproductive state for example. In contrast to Studer-Thiersch, half of the displaying bouts recorded in this study contained only one display action. Because these display actions are similar in form to normal comfort movements and everyday activities [Kahl, 1975], the possibility exists that some actions were recorded as displays when in fact they were not.

Studer-Thiersch [1975] distinguished between high and low intensity display behavior. During high intensity display, birds are in close proximity, and display rapidly and synchronously. Low intensity display is characterized by low rates of display and display synchrony, and individuals being further apart. During high intensity display both Caribbean flamingos and greater flamingos began displays with a WS→TP→IV→TP sequence. At low intensity, male Caribbean flamingos often initiated displays with a WLS→TP sequence [Studer-Thiersch, 1975]. Among female Caribbean flamingos, WLS was frequent at high intensity and so their display sequences tended to be more variable than those of males; however, WLS rarely was the first action in female displaying bouts [Studer-Thiersch, 1975]. In the current study, sex differences in display bout structure were noted with some sequences being more common in males than females and vice versa. Male displaying bouts that contained several display actions were often initiated with wing leg stretches. Male display bouts containing only two or three actions tended to be initiated with wing salutes and were followed by either twist preens or inverted wing salutes. Among females, wing salutes were fairly common but were most often performed alone and were the first display action in multi-action display sequences 28.5%

alone and were the first display action in multi-action display sequences 28.5% of the time.

Studer-Thiersch [1975] concludes that sexual dimorphism in display behavior is more pronounced in Caribbean flamingos than in greater flamingos. He also states that the display behavior of female Caribbean flamingos does not differ between high and low intensity and that female displays are less restricted to a particular situation and thus contain less precise information compared to male displays. I found that males are more likely to display than females, female display bouts contain more actions, and the relative frequency of certain display action sequences differs between males and females. Males and females use display actions in equal proportions. Therefore, although some dimorphism exists in display behavior, its significance remains unclear.

It has been concluded from studies of wild flamingos that display behavior serves a purpose other than mate attraction [Ogilve and Ogilve, 1986; Studer-Thiersch, 1975]. My results both support and refute this idea. In my study, males were more likely to display, which would be expected if this is a polygynous system in which males try to attract females; however, female displays were more complex, and therefore may contain more information about reproductive condition or fitness.

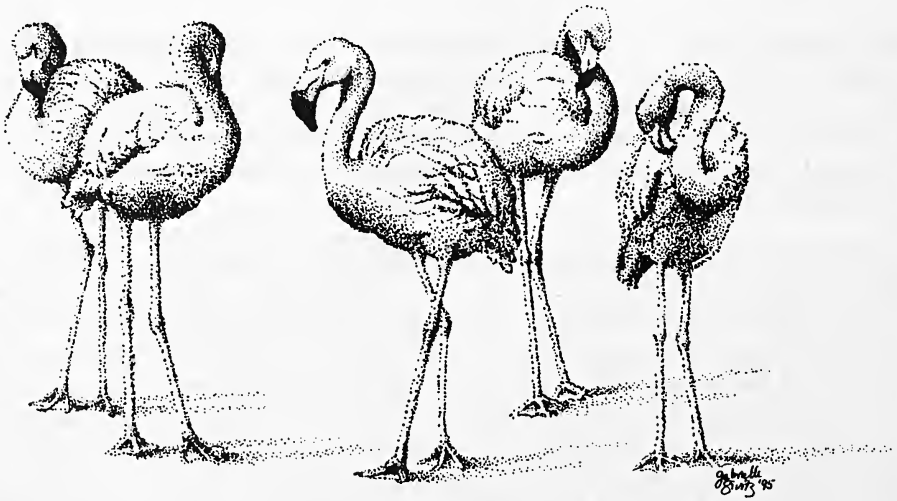
Flamingos are colonial breeders which require adequate rainfall to build nests and have enough food to raise chicks. It has been suggested that increased breeding synchrony is advantageous when there is a short term food supply and for minimizing predation [Darling, 1938]. Rainfall is seasonal in the tropical and temperate regions where flamingos breed; however, the duration and amount of rainfall is unpredictable. Clayton [1978] suggested that rainfall and other environmental stimuli probably stimulate gross reproductive synchrony and that socially facilitated behavior provides finer scale synchrony. Darling [1938] suggested that in colonial birds there was a relationship between synchronized behavior, physiological cycles, and successful reproduction. Birds in large colonies should experience greater social stimulation and thus their breeding cycles should be accelerated. This acceleration should lead to more synchronous egg laying than in smaller colonies. This has been called the "Fraser Darling effect". It has been shown that flock size and reproductive success are positively related in captive flocks of flamingos [Pickering et al., 1992, Stevens, 1991]. It is thought that group display behavior serves to bring birds into reproductive condition quickly in order to take advantage of rainfall when it occurs in adequate quantities for breeding; however, the mechanism of this social stimulation is unknown.

Given that rainfall is important in stimulating flamingo breeding behavior, Stevens [1991] investigated whether rain sprinklers could be used to induce group displays. She found that display frequencies were higher in the hours both during and after the sprinkler but not significantly so. Stevens and Pickett [1994] hypothesized that an increase in flock size would increase social stimulation and result in more display behavior. After increasing the Caribbean flamingo flock at the National Zoo by four young adult captive bred females and by seven adult birds prior to the 1989 and 1992 breeding seasons respectively, they found that display activity was significantly higher in the year following each addition to the flock, but that display activity dropped two years after new birds were added. They suggested that the effect of having new birds in the flock was greater than the effect of increased flock size or

that extreme environmental conditions may have offset the timing of displays during these breeding seasons and hence display behavior was not sampled at peak periods [Stevens and Pickett, 1994].

Because rainfall and hence nest building conditions are ephemeral, it would appear to be adaptive for flamingos to already have a mate selected when environmental conditions favor reproduction. One mechanism of assured mate selection is to pair with one partner for many breeding seasons. Previous studies of breeding in captive flamingo flocks have found that pair fidelity between breeding seasons ranged from 45 to 94%. However, Cèzilly and Johnson [1995] found that the overall rate of mate switching between seasons was 98.3% for Greater flamingos (*Phoenicopterus ruber roseus*) in the Camargue. In addition, they noted that 29% of males attempted to re-breed with a different partner after nest failure. The high degree of mate switching between seasons could not be explained by previous year breeding failure since at least 18 birds that had changed mates had bred successfully the previous year. They suggest that flamingos may be characterized as seasonally monogamous and that results observed in captive birds may be influenced by the small number of birds (compared to wild flocks) present, or by captivity itself [Cèzilly and Johnson, 1995]. King [1994] found 92% pair fidelity in their captive flock of flamingos; however, she also noted that 78.6% of males and 46.7% of females in known pair associations attempted to copulate outside their pair bond. Only two successful extra pair copulations occurred [King, 1994].

Twenty-five percent of Chilean flamingo (*Phoenicopterus chilensis*) pairs at the Santa Barbara Zoo engaged in extra pair copulations prior to the breeding season, and 60% did so once the breeding season was underway [Bennett, 1987]. Bowles et al. [1988] found that re-uniting of pairs in three penguin species is higher in captivity than in the wild. Pickering [1992] suggested that the degree of mate fidelity in captive flocks may be inversely related to colony size; Studer-Thiersch [1975] suggested that reproductive success increases as the length of the pair bond increases.



Artwork by Gabrielle Sivitz

If both of these conditions hold, then small captive flocks should reproduce well [King, 1994]. However this is not the case, small flocks tend to have low reproductive success [Pickering et. al, 1992; Stevens, 1992].

Flamingos are also under selection pressure to breed synchronously to reduce predation pressure [Cèzilly and Johnson, 1995; Ogilve and Ogilve, 1986]. Natural selection would therefore favor within-season mate switching after nest failure. Time from nest failure to relaying in the Camargue greater flamingo population varies from 15 to 35 days [Cèzilly and Johnson, 1995]. Because flamingos have only a limited time in which to hatch and raise their chicks, males should be favored to re-mate with an unpaired female instead of waiting for their current partner to recover from the energetic costs of egg production and be ready to lay again [Cèzilly and Johnson, 1995]. Studies of flamingos in the wild have shown that pairs which breed later in the season have lower success in rearing chicks.

In summary it appears that wild flamingos are polygynous in general but monogamous within a breeding season. Thus they may be most accurately described as serially monogamamous. Though captive flocks show high levels of mate fidelity between years, they also show evidence of extra-pair sexual behavior. If flock composition is held constant across breeding seasons, then mate fidelity should remain high assuming that males and females selected the most fit mates during the first breeding season that the flock was together. We would also expect that group display activity should remain relatively constant across breeding seasons given that birds are pairing with the same mates each year. If new birds were added to the flock, then we would expect there to be more mate switching because some pair members may find more fit mates among the new birds. Consequently, we would expect group display activity to increase given that previously stable pair bonds may be broken and new ones formed. This may explain why Stevens and Pickering [1994] found that display activity increased only temporarily after new birds had been added to a captive Caribbean flamingo flock at the National Zoo.

In my study, one male and one female displayed significantly more often than other members of their sex. These two birds were also involved in numerous aggressive encounters with other birds and frequently displaced other birds as they moved around the exhibit. The male who appeared to be dominant in the Parrot Jungle flock was also one of the largest birds in the flock. It is also interesting to note that these two dominant birds appeared to be a mated pair. They frequently followed one another when moving around the exhibit and exchanged vocalizations when they were far apart. Hierarchies have been demonstrated in other captive flamingo flocks and it has been suggested that dominance may play a role in reproductive success [Bildstein et al., 1993, Shannon, 1981]. Social interactions among flock members and dominance rank may influence the probability that each individual or pair association attempting to breed is successful [King, 1994]. The social hierarchy in the flock may explain why known pairs do not nest in a given year and why homosexual pairs are sometimes able to take over nests and eggs. Social rank may also influence the frequency or form of an individual's display behavior during the breeding season. Dominant birds may display more frequently in order to 1) advertise their dominance status to other flock members or 2) relate information to potential mates about their presumably greater fitness. If this is the case then we would expect that the most dominant male in the flock and the most dominant female would display more than other members of their sex and that these birds

would be a mated pair. This may be the case for the Parrot Jungle pair mentioned above.

While there are numerous studies of flamingo breeding habits in the wild and in captivity, there is still a paucity of literature on flamingos that focuses on the behavior of individual birds and their interactions with other flock members. Clearly more descriptive and quantitative studies of flamingo behavior are needed so that the behavioral ecology of this well known genus can be understood.

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The Rio Grande AAZK Chapter would like to offer our BFR T-Shirts to all AAZK members. They are white with a black design and are available in Lg. and X-Lg. and sell for $12.50 each. If you are interested please call Rhonda Saiers at (505) 254-7833.

Chapter News Notes

Greater Kansas City AAZK Chapter

Our Bowling for Rhinos fundraiser in May brought in $4,600.00. We had a great time with the members of the Topeka Zoo Chapter who came to bowl with us. Thanks, everyone! We had many great raffle and silent auction items and door prizes for all.

We are currently working on an offsite enrichment garden for the zoo and have dog washes and a book sale in the works. These are to help raise money for going to the Conference in Houston. Hope to see you there!

—Penny L. Cram, Chapter Liaison

South Florida AAZK Chapter

Officers for the Chapter for 1997 are:

President.....Scott Fuller
Vice President.....Paul Bermudez
Treasurer.....Susan Kong
Secretary.....Michael Hernandez
Liaison.....Patty Leon-Singer

Hello from South Florida. We've been busy so far this year with our Bowling for Rhinos event held last May. It was small but successful. In June, South Florida AAZK, in conjunction with the Miami Sequarium held a South Florida Social and Auction at the Seaquarium. Over 150 guests attended from the Parrot Jungle, the Center for Orangutan and chimpanzee Conservation, Lion Country Safari, the Dolphin Research Center, and Miami Metrozoo. Proceeds from the auction were split between the Manatee Halfway House and South Florida AAZK. In November we will hold the Fourth Annual Breakfast with the Keepers at Miami Metrozoo.

This year we plan to have five members attending the Conference in Houston. We hope to see you there. If you need to contact our Chapter, we now have e-mail access. Our e-mail address isSFAAZK@Juno.com.

—Paty Leon-Singer, Chapter Liaison

Montgomery Zoo AAZK Chapter

Hello from the new Montgomery Zoo AAZK Chapter! As a new Chapter we would like to announce our founding officers for 1997:

President.....Kim Hazelet
Vice President Ken Naugher
Sec'y/Liaison.....Michelle Herman
Treasurer.....Sylvia Smitherman

After a slow start our Chapter is finally getting things together. We are currently putting together a logo and discussing fundraising ideas. The Montgomery Zoo graciously allowed us to recycle the zoo's aluminum cans to provide funds for the Chapter. With all of the work of starting the Chapter, we all look forward to an eventful first year.

—Kim Hazelet, President

Milwaukee County Zoo AAZK Chapter

The Milwaukee County Zoo AAZK Chapter recently hosted the Great Lakes Regional Council Meeting. We had keepers from five zoological institutions participating in behind-the-scenes tours. Dr. John Sheels, a local dentist who has been associated with the Milwaukee County Zoo for 15 years, gave the keynote address. Dental highlights included preventative measures, observation techniques and case histories. We would like to thank everyone involved for making the meeting a success.

The Milwaukee Chapter had its first Bowling for Rhinos which raised $1,725.00. We were joined by the Racine Zoo and are looking forward to doing it again next year.

Our annual Bake Sale raised $157.00 - a special thanks to our bakers (especially Dawn Wicker) and our sweet-eaters for making this possible. We are putting the bake sale proceeds together with $100.00 from the MCZ Chapter to give to the National AAZK. We have also allocated $100.00 to help Andy Lodge in furthering his education efforts with the Ngare Sergoi Support Group.

It's been a great summer, and there's still more to come.

—Laurie Talakowski, Chapter Liaison

The North Carolina Zoo Chapter

The North Carolina Zoo AAZK Chapter celebrated its 10th anniversary this year. Elections were held in December with the results as follows:

President.....Hannah Decker
Vice President.....Charlene Baes
Treasurer.....Robin Sweet
Secretary.....Janice Coakley

We are trying different ideas at fundraising. Recently we held three bake sales, a yard sale, and a raffle. Some of these funds will be used to support members attending the 1997 National AAZK and Enrichment Conferences.

The Chapter raised $2643.00 for Bowling for Rhinos this year. Dr. Josephine Afema, a zoo veterinarian from Uganda, spent November-January training at the North Carolina Zoological Park (NCZP). Using a list Dr. Afema had provided, the Chapter bought some supplies needed (or difficult to obtain) by the keepers at the Uganda Wildlife Education Center. The Chapter has also supported a local wildlife rehabilitator and NCZP's 4-H group, enabling the group to buy T-shirts. We are in the process of planning a barbeque for the upcoming 1997 Association of Zoo Veterinary Technicians (AZVT) being held at the NCZP.

—Janice Coakley, Secretary

Rio Grande AAZK Chapter

Greetings from the "Land of Enchantment"! The Rio Grande Chapter has been busy the last few

months. We recently held elections to replace former Secretary/Treasurer Jennifer Brown. The position of Secretary will now be held by Stacey Sekscienski and our President Shelly Lindsay will add the Traasurer duties to her list of tasks.

We held several successful fundraisers including a Mother's Day flower sale where we sold carnations to the zoo going public. It was a bit hit! We have begun to expand our recycling project - AAZK recycle bins can be found all over the Albuquerque Biological Park.

We also adopted an orangutan through the Orangutan Foundation International in memory of the former zookeeper Joe Chavez. Our First annual Bowling for Rhinos earned almost $900.00 in sponsorship money - not bad for our first year!

Our bi-anual area enrichment grant was up for grabs again and was awarded to Rhonda Saiers for mammal enrichment items (giraffe and prairie dog), and to Jennifer Holdcroft for a book on avian diseases.

—Rhonda Saiers, Chapter Liaison

Rocky Mountain AAZK Chapter

New officers for the Denver-based Chapter are:

President.....Karen Stern
Vice President.....Connie Arthur
Secretary.....Susan Nolan
Treasurer.....Jan Collins
Chapter Liaison.....Linelle Smith

We are sorry to report that Susan Nolan has left the Denver Zoo - we'll sure miss her around here! But, we wish her all the best in her new married life! She will remain an active participant in our Chapter and National AAZK.

The Chapter has been busy organizing a local conservation program for Shortgrass Restoration involving employees throughout the zoo. Dolly Crawford is leading the charge in this very important effort.

We have at least four delegates attending the 1997 National AAZK Conference in Houston - we look forward to seeing some of you there!

--Linelle Smith, Chapter Liaison

ATTENTION ALL CHAPTERS

All AAZK Chapters are requested to send a copy of their current logo. We would like to consistently use logos in the Chapter News section and wish to make sure we are not utilizing outdated logos. Please send a clean, crisp black and white rendition of your Chapter logo. Send it **unfolded** with cardboard stiffener in the envelope to protect it against damage. We will be using Chapter logos via an image scanner, so they need to be unbent, clear and have good contrast. Also please include the year the logo was adopted by your Chapter and who did the logo design. Also, include if there is any particular significance to the animals depicted in your logo in relation to your zoo or geographic area. We will be working toward putting together a new Chapter Logo Registry in 1998 which will be distributed to all Chapters. Make sure your current logo is included! Thank you in advance for your assistance with this project.

--The Editor

Legislative Update

Compiled by Georgann Johnston
Legislative Advisor
Sacramento, CA
1-800-338-7348

Rocky Mtn. Whooping Cranes Loses Critical Habitat Designation

The U. S. Fish and Wildlife Service (USFWS) has determined that selected populations of the whooping crane (Grus americana) found in the Rocky Mountains should be designated as experimental, nonessential populations. Therefore, these populations of cranes will be removed from critical habitat designations previously applied to four National Wildlife Refuges in Colorado, New Mexico and Idaho. The USFWS has stated that it intends to use these wild populations, along with captive-reared sandhill cranes (*Grus canadensis*) and whooping cranes, in experiments to evaluate methods for introducing whooping cranes into the wild where migration is required.

The Endangered Species Act Amendments of 1982 allowed for the designation of specific introduced experimental populations of species already listed as endangered into geographic areas which they had not occupied previously or where no examples of the species currently were to be found. Because of objections by landowners in the area where the experimental populations were to be introduced, the USFWS was given further authority to designate these experimental populations as "nonessential" - allowing the Service greater leeway in managing the populations. This is because a "nonessential" experimental population is not subject to most of the procedural requirements of the ESA when a decision is made to instigate or cancel a program involving such a population. The basic rule which must be followed, however, is that individuals to be reintroduced into any experimental population can be removed from an existing source or donor population only if such removal is not likely to jeopardize the continued existence of the species.

In 1975, the USFWS began an experiment to reintroduce whooping cranes into their former range in the Rocky Mountains, a project which included "cross-fostering" whooping crane eggs into nests of greater sandhill cranes. The initial whooping crane population was comprised of 14 birds. The cross-fostering program was terminated in 1989 because it appeared that the whooping cranes were not pairing and the mortality rate was too high to establish a self-sustaining population. At this time, only three non-breeding adults of the original 14 birds remain. However, approximately 220 new individual birds, including 47 breeding pairs, reside in the area.

Thus, because of the new population of "native" birds, all Federal agencies will still be required to comply with the ESA requirements for carrying out programs to conserve this population, and the Act's consultation and the National Wildlife Refuge System' s compatibility requirements will still apply on National Wildlife Refuges.

More information about the decision and its impact on this species can be obtained from Susan MacMullin, USFWS Southwest Regional Office, 500 Gold Avenue SW., Room 4012, Albuquerque, New Mexico 87103-1306, voice (505) 248-6663; facsimile (505) 248-6922.

Source: 50 Code of Federal Regulations Part 17; effective 20 August 1997

USDA Requests Input to Develop Exotic Animal Handling Standards

The U. S. Department of Agriculture is seeking public comment to help establish standards under the Animal Welfare Act for the handling and/or training of exotic or wild animals. The request for input is predicated on public demand for training standards, said Michael Dunn, Assistant Secretary for Marketing and Regulatory Programs. These demands have come in response to several incidents over the past months where trainers or members of the public have been injured or put at risk by wild or exotic animals.

Priority will be given to comments received on or before 22 September 1997, but input received after that date will also become part of the APHIS file on the matter. Send an original and three copies of comments to Docket No. 97-001-1, Regulatory Analysis and Development, PPD, APHIS, USDA, Suite 3C03, 4700 River Road Unit 118, Riverdale, Md. 20737-1238.

Persons interested in seeing copies of the comments received must visit the USDA, Room 1141 South Building, 14th Street and Independence Avenue, S.W., Washington, D.C. Persons wishing access to this room are requested to Call in advance at (202) 690-2817.

Source: APHIS Press Release 24 July 1997

USFWS Proposes Establishment of Nonessential Grizzly Bear Population In Idaho

The U. S. Fish and Wildlife Service proposes to reintroduce a non-essential population of the grizzly bear (*Ursus arctos horribilis*), a threatened species, into east central Idaho and a portion of western Montana. The stated purpose of this reintroduction is to reestablish a viable grizzly bear population in the Bitterroot ecosystem in east central Idaho and adjacent areas of Montana, one of six grizzly recovery areas identified in the Grizzly Bear Recovery Plan.
The bears which will be used to establish this new population will be obtained from Canadian and United States grizzly populations with permission from the Canadian and Provincial governments and concurrence from the appropriate State officials.

From a peak population of over 500,000 bears before European settlers came to North America, the distribution and population levels of this species has been diminished by excessive human-caused mortality and loss of habitat. Today, only 800 to 1,000 grizzly bears remain in a few isolated populations in Montana, Idaho, Wyoming, and Washington, areas which represent approximately 2 percent of their historic range in the lower 48 States.

The USFWS reports that the reestablishment of a grizzly bear population in the Bitterroot ecosystem will "increase the survival probabilities and conservation of the grizzly bear in the lower 48 States. If the experimental population is lost, it will not further decrease the survival probability of the bear in other ecosystems beyond what currently exists. However, if the experimental population is successful it will enhance grizzly bear conservation over the long term."

Comments or other information may be sent by 9 October 1997 to Grizzly Bear Recovery Coordinator, U. S. Fish and Wildlife Service, University Hall, Room 309, University of Montana, Missoula, Montana 59812. For further information contact Dr. Christopher Servheen, at the above address, or telephone (406) 243-4903.

Source: 50 Code of Federal Regulations Part 17; Federal Register 2 July 1997 (Vol. 62, No. 127)

Endangered Status for Jaguar Extended

The Fish and Wildlife Service (USFWS) has extended endangered species status to the jaguar (*Panthera onca*) throughout its range. One important result of this new rule is that the jaguar is now also listed as endangered in the United States, as well as in Mexico and Central and South America.

In the United States the two primary threats to this species are illegal shooting and loss of habitat. A minimum of 64 jaguars were killed in Arizona since 1900 with the most recent admitted kill occurring in 1986. With respect to habitat (primarily Arizona and New Mexico), the presence of the species in the United States is believed to be dependent on the status of the jaguar in northern Mexico. Documented observations in the American Southwest are as recent as 1996. Critical habitat was found not to be prudent and therefore is not being designated.

Further details regarding the species and this finding by the USFWS can be obtained by contacting Sam Spiller, Field Supervisor, Arizona Ecological Services Field Office, 2321 West Royal Palm Road, Suite 103, Phoenix, Arizona 85021, telephone (602) 640-2720; facsimile (602)640-2730.

Source: 50 Code of Federal Regulations; Federal Register 22 July 1997 (vol. 62, no. 140)

Changes in Woodcock Hunting Season Rules Proposed by USFWS

Continuing declines in the population of woodcocks, has caused the U. S. Fish and Wildlife Service to propose several changes for the 1997 fall hunting season. Changes include a shortening of the season from 45 to 30 days in the Eastern Region and a comparable season shortening in the Central Region from 65 to 45 days. The limit in both regions would be three birds, down from five birds in the Central Region.

In a press release announcing the proposed changes the USFWS stated that

the primary intent is to stem the species' population decline, which has ranged from 39 percent in the Central and 52 percent in the Eastern Regions. The Service also stated that it recognized that "harvest reduction alone is not the solution and that biologists believe degradation and loss of habitat on both the breeding, migration and wintering grounds" have been the major reasons for the declines.

Source: USFWS Press Release, 18 July 1997

European Union Rejects Leghold Trap

The European Union (EU) currently has in place a ban on the importation and sale of pelts taken from wild mammals caught with leghold traps. Recently, the EU's Council of Environmental Ministers reconfirmed that policy by rejecting a proposal which would allow for "humane trapping methods" to be used to secure more pelts for the fur market. One of the primary animal pelts exported by the USA to Europe comes from the Canadian lynx. An article in an earlier edition of this column reported that the USFWS had decided that the lynx did not warrant listing on or protection under the U. S. Endangered Species Act.

A representative speaking for the Clinton/Gore administration stated that the EU ban is effectively a "trade barrier" which governs how an item may be produced and is not a legitimate environmental protection decision. Therefore, the administration is considering appealing the EU's action to the World Court on the basis that such "trade barriers" are prohibited by the General Agreement on Trade and Tariffs, a treaty entered into between various European countries and the US.

Even without the ban, a continuing decrease in the fur market has caused a loss of retail fur sales volume in the U. S. and Europe from $1.2 billion in 1995 to less than $850 million in 1996. The resulting drop in sales has lead to an overall decrease in trapping of approximately 20% for the last calendar year.

Source: Animal People: News for People Who Care About Animals, July/August 1997; International Fund for Animal Welfare press release, 20 June 1997

Butterflies Poached in National Parks

The Washington Post reports that Adriano Teobaldelli was caught attempting to smuggle 51 butterflies from Sequoia National Park. Officials found 200 butterflies in the poacher's motel room with extensive notes detailing that he had captured the rare species from Bryce Canyon, Arches and Canyonlands parks in Utah and Mesa Verde in Colorado. Endangered butterflies can be sold for as much as $500 a pair. "It's symptomatic of a recurring problem of poachers from all over the world coming into our national parks and turning them into the last supermarkets for traffickers of illegal wildlife," Fish and Wildlife Service's David Klinger said.

Source: GREENlines Issue #436 8/4/97 - Grassroots Environmental Effectiveness Network/a Project of Defenders of Wildlife

Surviving the Seasons

By
William K. Baker, Jr., Zoologist
1209 Tom Temple Drive, Lufkin, TX

Introduction

As the years have gone by I often find myself in retrospective thought about past experiences in the zoological profession. One of the things that always surprised me is just how many newcomers to the profession didn't understand that zoo keeping requires us to work in all weather conditions. It's one of the inherent truths of our profession that no matter what happens, the care and feeding of the animals must come first. But, after some thought, I realized that while there are guidelines for the care of captive animals in inclement weather, at no time have I seen any reference material for zoo keepers. What I have seen are keepers trying their best to adapt issue uniforms to the weather. This can be quite a challenge when considering that most zoo uniforms usually come from an industrial supplier and were never designed to function in inclement weather conditions. This led me to the conclusion that it should be possible to develop some general guidelines for zoo keepers, interns and volunteers on how to survive the seasons.

Dressing for Success

The first thing that should be understood is that clothing does not actually provide warmth. What clothing does do is help the body regulate the loss of heat which the body produces. The human body loses heat through radiation, respiration, conduction, convection, and evaporation. The two types that we are primarily concerned with are convection (the heating of air surrounding the body), and evaporation (the loss of body heat through perspiration). When these two factors are combined, they lead to the age-old question of "How can I possibly stay warm when my clothes are soaked with sweat?". This is the question that has been tormenting outdoorsmen and clothing manufacturers for years. The most difficult part of developing outdoor clothing has been trying to design fabrics that would keep warmth in, let perspiration out, and keep the body dry.

So, for many years the only options were cotton, down fill, polyester, and wool. But, cotton and down are useless when they get wet; polyester won't conduct perspiration; and while wool insulates when it's wet, it doesn't offer protection from rain. However, all this has changed with the advent of new synthetic fabrics and fill material. The most notable examples of these would be: polypropylene, Capilene®, fleece pile, Hollofil®, Quallofil®, Microfiber®, Klimate®, Gore-Tex®, and Gore Activent®. All of these fabrics and fills are highly waterproof, extremely breathable, lightweight, and compact. This means that a person can be physically active, sweat, and still remain warm and dry. Essentially what happens is water vapor generated by the body is "wicked" away from the

skin by fabric fibers and exits through micropores located on the exterior of the fabric. These micropores are small enough to allow vapor to pass out through the fabric, while preventing moisture from getting in. The result is staying warm and dry.

Unfortunately, there are two problem areas among this good news. One, fabrics that are waterproof and breathable have one major drawback - the more waterproof they are, the less breathable they become. As a result, the manufacturers offer some variability in their clothing lines to adjust to the regional climates. Second, depending on what manufacturer is chosen, where the clothing is purchased, and how new the product is will greatly determine the cost of the garment. The good new is that since these products have been around for a few years, the prices are finally starting to drop, especially for Gore-Tex® products. A few of the leading manufacturers of outdoor clothing are: Cabelas, Columbia, Helly-Hansen, Lowe, Marmot, North Face, and Patagonia.

The key to all of this is to dress in layers and to avoid padding the body with one single heavy layer of protection. This allows the fabrics to ventilate and creates multiple dead air spaces around the body providing greater warmth. Also, this gives the wearer more flexibility in adapting to changing conditions throughout the day. There are three layers used in dressing for cold and wet conditions: base layer, mid-layer, and outer layer. The base layer sits next to the skin and wicks water vapor away from the body. The mid-layer is normally the primary insulator in colder climates. The outer layer is the primary barrier between the body and the elements. In different climates and conditions these layers will vary in weight and use. If it's extremely cold, use all three layers. It it's cold, use only the first two layers. If it's cool and damp, use only the first layer. In rainy, warm weather skip using the first two layers and use an outer garment that is breathable, but waterproof. This will prevent the clammy sensation that occurs from trapped water vapor. Remember, flexibility is the key to an adaptable clothing system.

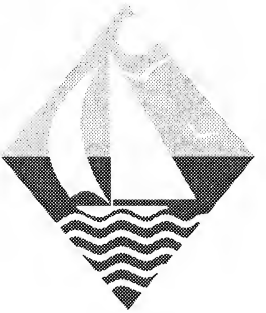
The only problem with all of this is that the zoo uniform must be worn. The best solution to this problem is to use the uniform as the mid-layer. In colder temperatures it will still be possible to wear high-tech underclothing. If a thin uniform jacket must be worn, then modify the interior of the jacket. One solution is to purchase a fleece pile vest to wear under the jacket or use it to replace the original lining altogether. Fleece pile garments are inexpensive and are the most popular choice today for the mid-layer. Also, there are a wide variety of fleece accessories available on the market today. Examples of this would be: gloves, scarves, neck gaiters, and headbands. Remember, flexibility is the key.

One of the areas that always seems to be taken for granted is one of the simplest - the tools that zoo keepers use in their daily duties. One of the best examples of this is a pocket knife or Leatherman® multi-tool. It is a basic truth of zoo keeping that we always seem to be building, repairing, or opening something. It also doesn't hurt to have your own personal hose nozzle and on/off connector for cleaning exhibits. Work gloves are important as well and should

never leave your side. The heavy leather work gloves used by ranchers and many zoological facilities are best. They're a pain to break-in, but they last forever if you take care of them. The key is to not dry them out with direct heat when wet (they crack), and to clean them occasionally with saddle soap or Lexol®.

Summer

This season of the year is typified by dry hot weather in most areas of North America. The main focus of the wardrobe should be to promote cooling through evaporation and protect the skin from the sun.



1. Wear loose clothing to promote evaporation.
2. Wear lightly colored clothing if possible.
3. Wear breathable and comfortable fabrics (cotton).
4. Wear a hat to protect your face and head from the sun.
5. Wear sunglasses to protect eyes from the sun's UV rays.
6. Use sunscreen to protect exposed skin from the sun.
7. Drink water at regular intervals throughout the day.
8. Wrap a wet kerchief around your neck to help cooling.
9. Use pest repellent (the DEET rating reflects usage)
10. Use leather work gloves during physical labor.

Autumn

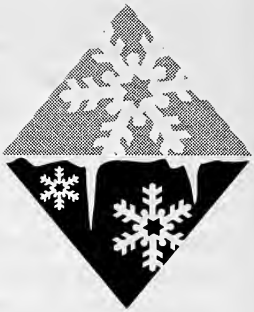
This season of the year is typified by transitional weather in most areas of North America. The main focus of the wardrobe should be to promote cooling through evaporation, protect the skin from the sun, and to insulate against periodic cold fronts.

1. Wear loose clothing to promote evaporation.
2. Wear lightly colored clothing if possible.
3. Wear breathable and comfortable fabrics (synthetics).
4. Wear a hat to protect your face and head from the sun.
5. Wear sunglasses to protect eyes from the sun's UV rays.
6. Wear a lightweight mid-layer to insulate against cold.
7. Wear water resistant outer layer for periodic rain.
8. Wear waterproof outer layer for heavy rain.
9. Drink water at regular intervals throughout the day.
10. Wear leather work gloves during physical labor.

Winter

This season of the year is typified by cold and wet weather in most areas of North America. The main focus of the wardrobe should be to insulate against extreme cold, protect against precipitation, and allow flexibility as conditions change throughout the day.

1. Wear insulating clothing to promote warmth.
2. Use the 3-layer clothing system to regulate warmth.
3. Wear breathable base layer fabrics (synthetics).
4. Wear a hat to insulate your head from the cold.
5. Wear sunglasses to protect eyes from the sun's UV rays.
6. Wear a heavy mid-layer to insulate against the cold.
7. Wear a water-resistant outer layer for periodic rain.
8. Wear a waterproof outer layer for heavy rainfall.
9. Use aloe0-based lotions and lip balm to protect skin.
10. Wear synthetic gloves or liners during physical labor.



Spring

This season of the year is typified by transitional weather in most areas of North America. The main focus of the wardrobe should be to promote cooling through evaporation, protect against precipitation, and allow flexibility as conditions change throughout the day.

1. Wear loose clothing to promote evaporation.
2. Wear lightly colored clothing if possible.
3. Wear breathable and comfortable fabrics (synthetic).
4. Wear a hat to protect your face and head from the sun.
5. Wear sunglasses to protect eyes from the sun's UV rays.
6. Wear a lightweight mid-layer to insulate against cold.
7. Wear a water-resistant outer layer for periodic rain.
8. Wear a waterproof outer layer for heavy rainfall.
9. Drink water at regular intervals throughout the day.
10. Wear leather work gloves during physical labor.

Discussion

Every person has their own particular "comfort zone". The best way to find that zone is by experimenting with different clothing combinations. After some trial and error, an individual should have a good idea of what works. Also, it should be possible to modify an issue uniform's internal effectiveness without changing the external professional appearance. In other words, you should be warmer and dryer without looking like a street person.

The accessories that are available on the market offer a wide variety of styles and designs. Many of the gloves are available with half-fingers. These can be especially useful for keepers who need fingertip dexterity to open locks and operate machinery. A couple of useful items are glove and sock liners. They provide an extra layer of protection in cold conditions.

If the prices of some of the high-tech garments are too expensive, remember that wool can be an effective, low-cost replacement. Virgin wool is the best

insulator and most water resistant due to the high lanolin content. But, look for wool blends with acrylic and lycra when stretchable fabrics are needed.

Also, don't forget to pay attention to your footwear. This is one of the few articles of clothing that zoo keepers are absolutely dependent upon. Make sure that the shoes are comfortable, durable, flexible, and provide solid traction. One of the better styles on the market today are low-cut hiking boots or approach shoes. Take a few minutes to look through some outdoor clothing catalogs and check your local sporting goods store, it might turn up some useful items.

Another area that is often overlooked is skin care. Zoo keepers are always cleaning, rinsing, or working near water. This can severely dry and crack hands at any time of the year and especially during the winter months. For general purpose skin care look for aloe-based skin lotions and lip balms. If the skin is already cracking due to constant exposure to water and physical labor, then a more aggressive treatment will be needed. I would recommend Corn Huskers Lotion®, Bag Balm®, or Corona Ointment®. They have been popular treatments with farmers and ranchers for years. For chapped or cracked lips try either Blistex® or Carmex® for a more aggressive treatment. In the summer months use a sunscreen. The most important point to consider is the SPF (Sun Protection Factor). The higher the SPF, the more protection from the sun's rays the wearer will have. Most manufacturers offer a chart to recommended SPF levels that is related to the different skin types. When dealing with insect repellent look for the DEET rating which will help indicate the relative strength. Individuals with sensitive skin should read the contents and cautions to avoid allergic reactions. Once again, this is a case of trial and error to find out what works and what doesn't.

Conclusion

This information is presented in the hope that it will aid individuals in the zoological profession with some general guidelines. It is understood that every region will have its own particular weather patterns and not all of the information presented may be applicable. However, it should provide a resource to build on over time.

Acknowledgements

The author would like to take this opportunity to thank Patricia M. Hainley of the Ellen Trout Zoo for her advice and assistance during the editing of this paper.

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Treatment of Traumatic Myiasis in a Wild Indian Elephant (*Elephas maximus indicus*)

By
Dr. M. Ahamed Ibrahim, B. V. Sc., Consulting Veterinarian
Malayandipattinam - 642 114, Tamilnadu, India

Introduction: Traumatic myiasis conditions affecting wild elephants are rarely reported. The case presented here reports the management of a maggot infestation in a female wild Indian elephant (*Elephas maximus indicus*).

Case History: An adult, non-pregnant, non-lactating female wild Indian elephant, age about 40 years, was reported by the District Forest Officer in charge of the Indira Gandhi Wildlife Sanctuary (Pollachi, India) to be frequenting the forest area near the guest houses. Examination and possible treatment of this animal was requested.

Clinical Examination and Treatment: The animal was located and its body weight determined to be about four tons (8,000 lbs). For clinical examination, the animal was immobilized using dart projectile equipment with 3.75 ml (0.1 oz.) of Immobilan® from a distance of about 30 ft. (9m). After the dart hit the right shoulder region, the animal ran here and there in a stumbling gait and after six minutes became recumbent in a sternal position. The animal was examined immediately. Detailed examination revealed the presence of one deep wound (about 15cm depth [5.9"] and 10cm [3.9"] diameter) containing blood, pus, and maggots. The wound was located under the belly just behind the mammary glands. The affected part was irrigated with 1% boric acid solution. The maggots were removed manually and turpentine gauze was packed inside the wound. An injection of Benzathine Penicillin (480 Lakhs I.U.) and an injection of Tetanus antitoxin (2 Lakhs I.U.) were given intramuscularly at different sites on the animal. A blood sample was collected for routine examination and analysis.

The whole operative procedure was completed in 20 minutes. An injection of 3.75ml (0.1 oz.) Revivon® was given intravenously to reverse the anesthetic effects of the Immobilan®. After six minutes, the animal was standing and remained in the area for four hours without showing any side effects. Later it went deep into the woods. Two weeks later the animal was found with a healed wound and exhibiting normal habits.

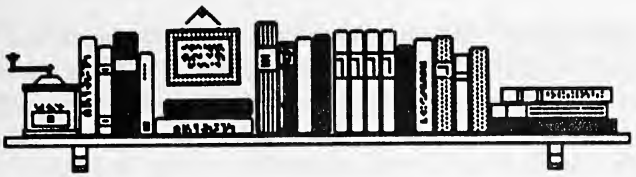
The hematological findings of the blood of this elephant were as follows:

1) Hb	11.2g/100ml
2) PCV	35.4%
3) ESR	62mm/hour
4) RBC Count	2.5×10^6/cmm
5) WBC Count	10.6×10^3/cmm

6) Differential Leukocytic Count:

a) Neutrophils	33%
b) Lymphocytes	57%
c) Monocytes	4%
d) Eosinophils	6%
e) Basophils	Nil

Summary: This case highlights an example of a proven method of controlling, immobilizing and treating a wild Indian elephant with much success.



Book Review

Geckoes: Biology, Husbandry, and Reproduction
by Friedrich-Wilheim Henkel and Wolfgang Schmidt. Krieger Publishing Company, Malabar, Florida. 1991 (German Edition), 1995 (English Edition). 237 p. Hardcover.

Review by: Chuck Smith, Student,
The University of South Carolina, Columbia, SC 29202

Over the past decade or so, the amount of herpetological literature being produced, and herpetology in general for that matter, seems to have exploded. Literature resulting from this extraordinary increase in interest runs the gamut from amateur herpetoculturist newsletters, to glossy full-color magazines, to refereed scientific journals.

Even with the tremendous amount of literature published to date, it is often difficult to locate one source that consolidates the pertinent information on a particular group of reptiles or amphibians. Exceptions do exist however. For instance, Klauber's classic two-volume set "Rattlesnakes: Their Habits, Life Histories & Influences on Mankind" remains THE definitive work on rattlesnakes. For boas and pythons it is Ross and Marzec's book. "The Reproductive Husbandry of Pythons and Boas." With geckoes, however, there appears to lack a reference detailing both the natural history and captive care of these animals as a whole. Numerous individual papers have been published and the information is often quite useful, but finding it might require many hours sorting through various herp journals and bulletins.

In "Geckoes: Biology, Husbandry, and Reproduction," authors Friedrich-Wilhelm Henkel and Wolfgang Schmidt attempt to mesh their 20 years of experience with information gleaned from earlier herpetological literature to produce a comprehensive survey of gecko natural history and husbandry. In many respects, their work succeeds in doing just that.

This book is divided into five main sections. The first of these sections (Lifestyle, Appearance, and Distribution of Geckoes) presents general natural history information as well as some insight into the physiological workings of geckoes. Included under this heading are subtitles such as Systematics, Habitat and Distribution, Vocalization and Hearing, and Territorial and Defence Behaviour. Considering the extent of the ecological niches inhabited by geckoes, the authors manage to provide a very concise overview of the unique physiological and behavioral adaptations found among these lizards. Included is a thorough discussion of the foot anatomy which allow some species to cling to smooth vertical surfaces. This subsection, as well as that on territorial and defence behavior, is well-written and quite fascinating.

Section two (Reproduction) provides a summary of reproductive strategies used by various gecko species under natural conditions, in addition to information pertinent to captive breeding. Subjects touched upon here are methods for determining the sex of individuals, reproductive behaviour, oviposition, and the role of incubation temperature in determining the sex of offspring. Regrettably this section is rather brief (only 16 pages) and as a result the subject is not treated with the thoroughness of the previous section. This may be partially due to the lack of reproductive data for many gecko species. However, there is some very useful reproductive data for selected species included later in the text.

For the experienced gecko keeper, there probably will be little in the above section that is not already known. For someone just beginning with these animals, however, the reproduction section is a good starting point toward understanding the many complexities in housing and breeding these animals.

Sections three and four are entitled The Vivarium and Vivarium Technology and include specific recommendations for constructing and outfitting enclosures for captive geckoes. This section is very nicely done and includes important considerations such as substrates, heating and lighting, selecting plants for the vivarium, feeding, breeding, incubation, rearing of offspring, and diseases of geckoes, as well as a very useful section on maintaining food stock for insectivorous species.

Perhaps the most useful aspect of this book, especially to the herpetoculturist, is the final section: Geckoes Frequently Kept in Captivity. Here the authors have selected 76 species of geckos from 43 genera in which to present specific guidelines on husbandry and care. These guidelines include the types of vivarium necessary to maintain each of the species, recommendation for food items, protocols for breeding, egg incubation, and rearing of young. As is common in many German herpetoculture publications, the information is present in a "cookbook" style. Anyone contemplating keeping geckoes in captivity would do well to consult this book, and particularly this section, before acquiring any animals.

Rounding out the bulk of the book is a seven-page bibliography. As to be expected in a book translated from German, a majority of the entries are in German, limiting its utility somewhat to English-speaking readers.

Now that I have familiarized the reader with the contents of this book, I would like to briefly state my opinion. Considering the breadth of the subject matter, the book is well done and highly informative, especially to the beginning gecko keeper, and while it is not a match for Klauber or Ross and Marzec's definitive works, there is still enough useful information to make this book a worthwhile acquisition. The writing is concise and highly readable (a compliment to the translator John Hackworth), the typographical errors are few, and the format is such that one will very probably find themselves referring to the text often, especially for incubation and neonatal care data. On a more practical note, the construction of this book is extraordinarily sturdy. The binding, with some care, will clearly last for many years, as will the pages which are fabricated from heavy mill paper.

Of course a review of this type would not be complete without mentioning the photography and happily the book is profusely illustrated throughout with very high quality photographs.

In closing, I highly recommend Henkel and Schmidt's work to anyone with an interest in gecko biology and care. As the herpetology field continues to expand, hopefully works of this type and quality will also continue to be produced.

The Great House of Birds
Edited by John Hay
Sierra Club Books, San Francisco, 1996
Hardcover, 306 pages, $24

Review by Nell Bekiares
Animal Care Intern
Cincinnati Zoo, Cincinnati, OH

It has been said that art imitates life. In this case, life imitates art. John Hay painted an impressionistic portrait of birds using little dabs of life. Hay's objective was to present birds as both organisms and as objects of beauty and spirituality. In his introduction to the collection, Hay noted that the purpose of the book is to "balance myth, poetry, and natural history...[for reflections with] birds on many different levels (xi)." To this aim, Hay was successful.

The appeal of this book is broad. It was a Sierra Club Book-of-the-Month selection. To specific audience members, it reads differently than it does to others. Some of the articles may enlighten a scientist about the aesthetic appeal of flight. For the naturalist and birder, it contains essays to complete a literary "life-list." Art appreciators may learn a little natural history as they read through the collection. Students, too, may find the book helpful. The Great House of Birds would be as appropriate in a high school English class as in a college biology class.

The book is loosely organized in sections into which articles, essays and poetry fit. However, the organization is loose. Some essays could as easily fit into "Flight" as into "Birds of the Sea," for example. The tightest groupings are "Birds of the Sea" and "The Migrants," whereas "Art and Ritual" is a section into which any bird-related piece would fit.

Walt Whitman's poem, "To Man-of-War Bird," is a particularly moving piece, as is *The Aesthetic Sense* by Karl Von Frisch and *How Birds Migrate* by Roger J. Pasquier. One of the strengths of this book is the variety of authors and media presented. Each piece is short and the book can be read in small allotments of time, or one may choose to read the whole thing during one sitting. My favorite author, Konrad Lorenz, may not compare to yours or the approximately 70 others. Perhaps one of the only weaknesses one might find is the limited length of the essays, which may be only a three-page excerpt of a larger work.

Overall, Hay collected an interesting assortment of works concerning birds. The Great House of Birds is a fun read and a worthwhile investment for yourself or as a gift to a nature lover.

Institutions wishing to advertise employment opportunities are asked to send pertinent data by the ***10th of each month*** *to: Opportunity Knocks/AKF, 635 S. W. Gage Blvd., Topeka, KS 66606-2066. Please include closing date for positions available and when setting these dates keep in mind that because of bulk-mail, most readers do not receive the AKF until the middle of the month or later. There is no charge for this service and fax listings of positions which become available close to deadline are accepted. Our fax is (785) 273-1980.*

ZOOKEEPER/ASIAN DOMAIN...requires good written/oral communication skills and the ability to work effectively in a team-oriented environment. Associate's degree in biology or related field and three years' experience preferred or equivalent combination of training/experience in the care of mammals, preferably elephants, carnivores and ungulates. Will work elephants in free-contact program. Salary commensurate with experience. Send resumé to: Rhonda Votino, Assistant Curator of Mammals/Asian Domain, Audubon Institute, P. O. Box 4327, New Orleans, LA 70178. EOE.

ZOO KEEPERS...Zoo of Acadiana is looking for high-energy individuals who would enjoy caring for exotic animals at a world class zoo. Duties include daily animal care, maintenance of exhibits and grounds, and ability to work in a team-oriented environment essential. Must have one year paid experience in custodial care of animals, birds and reptiles at recognized zoo. **Position open until filled**. Send resumé and two work references to: Ron Cline, General Curator, Zoo of Acadiana, 116 Lakeview Dr., Broussard, LA 70518; phone - (318) 837-4325; fax - (318) 837-4325; e-mail - curator@linknet.net

ASSISTANT ELEPHANT TRAINER...this position requires at least two years experience working free contact with both adult and young elephants. A degree in zoology or animal science is preferred. Applicant must have good speaking skills and experience presenting animal demonstrations. Salary: $11.25 per hour. Contact Don Bloomer, Entertainment Dept., Nugget Hotel/Casino, P. O. Box 797, Sparks, NV 89432, or phone 1 (800) 648-1177 ext. 3316.

SENIOR ZOO KEEPER/ELEPHANTS...Chaffee Zoological Gardens of Fresno, CA is looking for zoo professional with experience in protected contact of elephants who is interested in helping transform the current program from free contact to protected contact. Responsibilities will also include the guidance of keeper staff, assistance in collection planning and institutional protocol. Required 30 units of accredited college level course work in animal science, zoology, biology, wildlife management, or a closely related field, AND two (2) years of journey-level paid experience *with elephants* in a zoo setting (preferably AZA accredited) which included care, handling and feeding. Additional qualifying experience may be substituted for the required education, on the basis that 15 semester units equals one year of experience. Salary range $2,108.00 to $2,565.00 per month. **Opening date is 1 Sept., 1997; closing date 17 October 1997, postmarks are not acceptable.**

ZOO VETERINARIAN...must have DVM degree from an accredited institution, a license to practice veterinary medicine in Texas, a Texas DPS and federal DEA clearance to administer class two narcotics, USDA accreditation to certify health for interstate and international transport, and experience with birds, reptiles, amphibians, fish and mammals. Seven to ten years experience required as a veterinarian working with exotics. Must have excellent surgical skills and skill with all forms of chemical immobilization and excellent oral and written communication skills. Duties include providing medical and surgical care and treatment for an animal collection of 3500 specimens of over 700 species, implementing and monitoring the preventive health care program, working closely with the animal management staff (curators, supervisors and zoo keepers). Supervises the staff of the Health Center including an associate veterinarian, a supervisor, a veterinary technician, a lab technician, and two zoo keepers, and is also responsible

for the Nutrition Center staff. Conducts post-mortems and interprets findings. Ensures compliance with local, state and federal laws and regulations regarding animal care and treatment. This position is responsible for a budget of about $500,000.00 . Ensures medical records are updated and maintained at a high level of accuracy and professionalism. Qualified candidates may send a resumé and three references **by 31 October 1997** to: Arnold J. Cardenas, Human Resources Manager, San Antonio Zoo, 3903 N. St. Mary's St., San Antonio, TX 78212. EOE. Drugfree Workplace.

The following three (3) positions are available at the Heritage Zoo. Send resumés for any of the following positions to: Dale J. Bakken, Director, Heritage Zoo, 2103 West Stolley Park Road, Grand Island, NE 68801.

WOLF KEEPER...person required must have at least one year experience working with wolves in a captive contact situation. Duties would also include zoo care of other carnivores. Would be required to work weekends and holidays. Competitive wages and benefits.

ASSISTANT DIRECTOR...person required must have at least six (6) years work experience in an accredited zoo and at least four (4) years experience as a supervisor. Competitive wages and benefits.

MARKETING/PUBLIC RELATIONS...person required must have at least one (1) year paid experience in either marketing or public relations in a zoo environment. Some weekend and holiday work required. Competitive wages and benefits.

CHIMPANZEE CAREGIVER...one full-time position open. Requires two years of college level course work, two years experience in the care of exotic animals; **OR** an equivalent combination of experience which provides the required knowledge, skills, and ability. Primate experience a plus. Assist in the responsibility of caring for approximately 80 chimpanzees (*Pan troglodytes)* in a breeding colony. Must be willing to make at least a two-year commitment. Excellent benefits. EOE. Applicant must have a negative TB skin test, negative hepatitis B surface antigen test, and evidence of measles booster or natural disease prior to employment. Send letter of interest (with requested salary), resumé, and three letters of reference to: Jo Fritz, Director, Primate Foundation of Arizona, P. O. Box 20027, Mesa, AZ 85277-0027. **Position open until filled.**

ANIMAL KEEPER/BIRD DEPT....each candidate must have one year's paid experience in the care and handling of a variety of birds, excluding pets; or have six (6) months experience in the care and handling of animals in a zoological institution; or have a Bachelor's Degree from an accredited college or university in biology, zoology, animal science or veterinary technology. Under the direct supervision of a Senior Keeper and/or Curator. Send resumé to: Personnel Department, Baltimore Zoo, Druid Hill Park, Baltimore, MD 21217.

EXOTIC CAT TRAINER/WILDLIFE EDUCATOR...position is with the Education Department's Cat Ambassador Program. Requires B. S. in zoology, biology, behavior or related field of study or Moorpark College EATM degree. Should have two years working experience with large carnivores and excellent public speaking skills. Zookeeping and training experience preferred. Duties will include care and maintenance of animal quarters and equipment; care and maintenance of collection which includes Bengal tiger, cougar, cheetah, serval, ocelot, caracal, Canada lynx, house cat and others. Will train animals as instructed by supervisor and make show presentations in schools and for zoo events. Salary to be decided plus benefits and bonuses. Send resumé and letter of interest to: Cincinnati Zoo & Botanical Garden, c/o Janet Rose, Cat Ambassador Program, 3400 Vine St., Cincinnati, OH 45220. **Application deadline is 30 September 1997.**

KEEPER/EDUCATOR...Immediate Need: Road Ark is looking for a multi-talented person to travel with our educational exhibit called Envenomators - the Deadly Snakes of North America. Please call or fax resumé if: you have handled **HOT** snakes; have experience with public, school groups, TV, radio and newsservices. Minor maintenance of the exhibit will be required. You must be able and willing to travel with the show. Salary based on experience. Contact Road Ark, 1544-A Center Dr., Santa Fe, NM 87505; phone (505) 474-6990; fax (505) 474-6630.

SENIOR KEEPER/HERPETOLOGY/HOUSTON ZOO...requires Associate's Degree in biology, zoology, or related field; minimum of two years experience in the care of a variety of reptiles and amphibians; expertise in herpetology/batrachology; strong interpersonal/organizational skills. Duties include supervision of four keepers as well as cleaning, feeding, maintaining exhibits, medicating, record keeping, materials/supplies procurement, participation in educational/outreach/conservation programs and related duties. Salary: $11.25/hr plus excellent benefits. Send letter/resumé to: Richard "Red" Bayer, Assistant Manager, Houston Zoo, 1513 N. MacGregor , Houston, TX 77030

ANIMAL KEEPER POSITIONS (4)...the Oakland Zoo will have four animal keeper positions available very soon. One will need to be filled by the end of October 1997 and the other three positions we intend to fill in January 1998. Requires at least six (6) months experience working with animals as an animal keeper or equivalent hours in volunteer time. Requires a high school diploma; however, a degree in zoology or other biologically related field is preferred. Operant conditioning and other behavioral training are desirable. Salary is $10.00 per hour plus medical, dental and life insurance. Two weeks vacation per year. To apply send resumé to: Colleen Kinzley, General Curator, P. O. Box 5238 Oakland, CA 94605. **Closing date is 31 October 1998.**

ZOOKEEPER/MAMMALS...requires minimum of three (3) years paid, hands-on experience with mammals and a degree. Duties include daily care, feeding, habitat upkeep, record keeping, medical coordination and presenting educational programs, etc. Must be willing to work weekends/holidays. Starting salary $16,000.00 to $21,000.00 with year-end bonus and benefits. Excellent growth potential. Salary commensurate with experience. Send resumé/references to: Cougar Mountain Zoological Park, 19525 S. E. 54th, Issaquah, WA 98027. Fax (425) 392-1076. **Position open until filled.**

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☐ **$35.00 Associate**
Those not connected with an animal facility

☐ **$60 or up** - *Individuals*
Contributing/Canada

☐ **$100.00 or up**
Institutional/Canada
Organizations / Institutions (requires Board approval)

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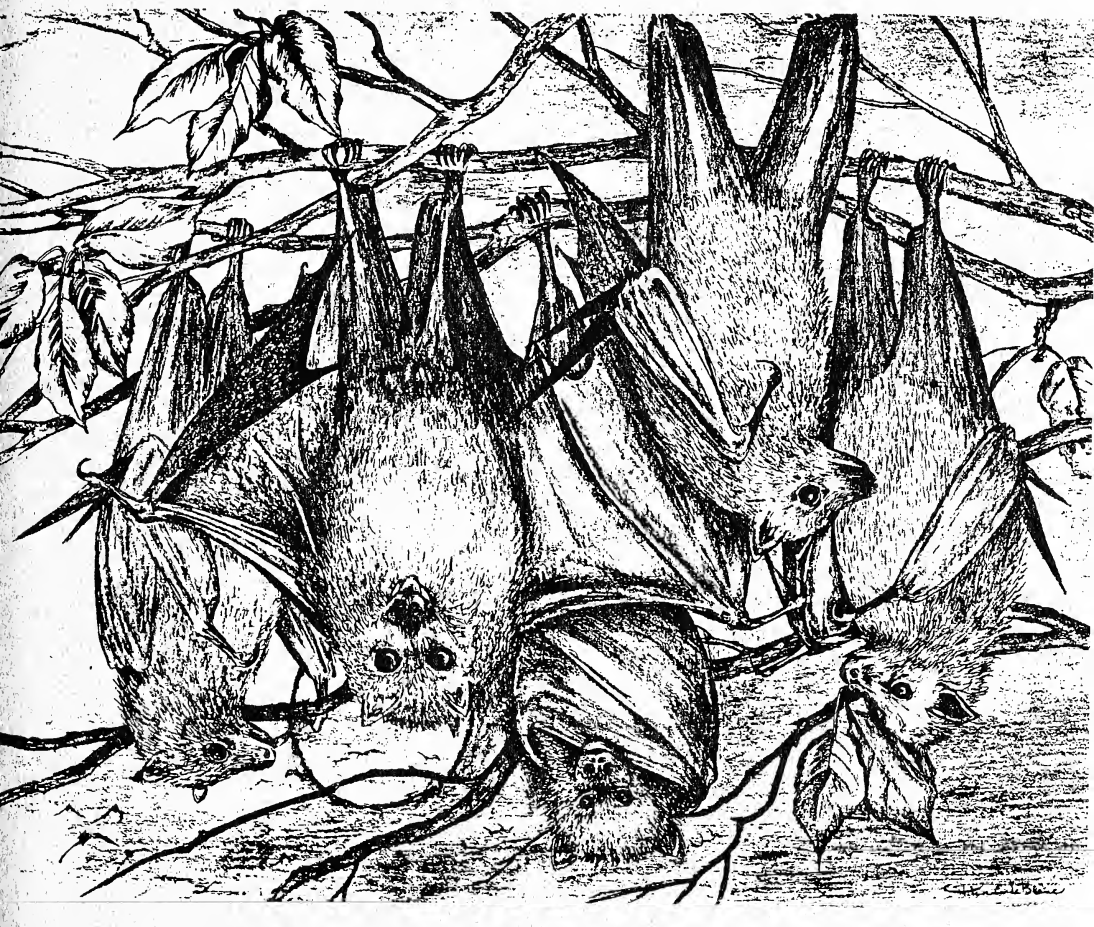

The Journal of the American
Association of Zoo Keepers, Inc.
OCTOBER 1997

ANIMAL KEEPERS' FORUM, 635 S.W. Gage Blvd., Topeka, KS 66606-2066
Phone: 1-800-242-4519 (U.S.) 1-800-468-1966 (Canada) FAX (785) 273-1980

OCTOBER 1997
Vol. 24, No. 10

Managing Editor: Susan D. Chan • **Associate Editors/Enrichment Options Coordinators:** Kayla Grams, Arizona-Sonora Desert Museum & Gretchen Ziegler, Sequoia Park Zoo • **Book Review Coordinator:** Andrea Bernee, Chaffee Zoological Garden • **Legislative Outlook Column Coordinator:** Georgann B. Johnston, Sacramento, CA. • **ABC's Column Coordinator:** Diana Guerrero, San Diego, CA • **Reactions Column Coordinator:** William K. Baker, Jr., Lufkin, TX

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About the Cover.....

This month's cover features an original graphite design of the Rodrigues fruit bats (Pteropus rodricensis). Entitled "Monlight",it was drawn by Helen LeBlanc for The Lubee Foundation, Gainesville,FL. The Rodrigues fruit bat is endemic to the island of Rodrigues in the Republic of Mauritius in the Indian Ocean. These bats play an important role in the ecology of the island by serving as pollinators for the fruit they consume. The Lubee Foundation, Inc. currently houses 31 Rodrigues fruit bats. Thanks, Helen!

Information for Contributors

Animal Keepers' Forum publishes original papers and news items of interest to the animal keeping profession. Non-members are welcome to submit articles for consideration. Articles should be typed or hand-printed and double-spaced. Authors are encouraged to submit their manuscripts on a disk as well as in hard copy form. Acceptable formats include: for Macintosh users - Microsoft Word or Works; IBM users - Word for Windows, WordPerfect or Wordstar. All illustrations, graphs, charts and tables should be clearly marked, in final form and should fit in a page size **no greater than** 5.5" x 8.5" (14cm x 22cm). Literature used should be cited in the text (Brown, 1986) and alphabetically in the final bibliography. Avoid footnotes. Include scientific name (as per ISIS) the first time an animal name is used. Thereafter use common name. Use metric system for weights and measurements (standard equivalents may be noted in parenthesis). Use the continental dating system (day-month-year). Times should be listed as per the 24-hour clock (0800, 1630 hrs. etc.). Glossy finish black and white photos **only are accepted**. Color slides should be converted to black and white prints (minimum size 3" x 5" [8cm x 14cm]) before submission. Clearly marked captions should accompany photos. Please list photo credit on back of photo.

Articles sent to *Animal Keepers' Forum* will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for *AKF*. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed, appropriately-sized envelope. Telephone and FAX contributions of late-breaking news or last-minute insertions are accepted as space allows. However, long articles must be sent by U.S. mail. Phone 1-800-242-4519 (US); 1-800-468-1966 (Canada); FAX (785) 273-1980.

Deadline for each regular issue is the 10th of the preceding month.
Dedicated issues may have separate deadline dates
and will be noted by the editor.

Articles printed do not necessarily reflect the opinions of the *AKF* staff or the American Association of Zoo Keepers, Inc. Publication does not indicate endorsement by the Association.

Scoops & Scuttlebutt

New AAZK Officers Announced

Ric Urban, Houston Zoological Gardens, and Diane Callaway, Omaha's Henry Doorly Zoo, have been re-elected to their respective positions as President and Vice President of the Association. They will each serve a second, two-year term which begins at the 1997 Houston Conference and will be completed at the close of the 1999 Conference in Portland, OR.

1997 AAZK Research Grant Recipient Announced

John J. Piazza, Dallas Zoo, is the successful recipient of this year's zoo keeper-initiated research grant. The proposed emphasis of this project, "Creation of an African Rhinoceros Video Ethogram", will hopefully provide important tools to further understanding of the behaviors exhibited by this endangered species, and to unify the future behavioral studies.

For further information about this project and to inquire about the Research Grants Committee's annual granting process, please address your questions and comments to: Farshid Mehrdadfar, Chair/AAZK Research Grants Committee, Disney's Animal Kingdom, P. O. Box 10000, Lake Buena Vista, FL 32830-1000. E-mail: farshid@sprynet.com

Conservation Grants Submission Process Initiated

The American Association of Zoo Keepers, Inc. announces the availability of two $500 conservation grants for the benefit of local and global conservation efforts. AAZK members in good standing interested in applying for these grants should direct their inquiries **by 31 March 1998** to: Brett Sellers, Chair, AAZK Conservation, Preservation and Restoration Committee, Metro Washington Park Zoo, 4001 SW Canyon Rd., Portland, OR 97221.

ADT Forms Available for Animal Shipments

Animal Data Transfer Forms (ADT) for use whenever an animal is shipped to a new location are available free as a professional courtesy from AAZK, Inc. These forms help provide vital information on an animal's medical, dietary and reproductive history to the receiving institution's staff and veterinarian. We hope you will encourage the use of ADT forms at your facility whenever an animal is shipped. To order a supply of ADT Forms, contact Bernie Feldman, Burnet Park Zoo, One Conservation Place, Syracuse, NY 13204.

Milwaukee AAZK Donation Recognized

The AAZK Board of Directors and the Administrative Office staff would like to thank the members of the Milwaukee County Zoo AAZK Chapter for their recent donation of $256.25. The Chapter held a very successful bake sale and then added an additional $100 to assist the Association in its budgetary needs. They

have designated the donation for the AAZK General Operating Fund. Such support of AAZK's projects and programs is very much appreciated. This amount equates to approximately three-quarters of the domestic postage costs for mailing a month's issue of *Animal Keepers' Forum*.

NOTICE: Enrichment Books No Longer Available

We are currently sold out of the AAZK Enrichment Notebooks and cannot fill any orders at this time. Should the AAZK Board decide to reprint this popular resource notebook, we will announce its availability in *AKF*.

Long-time AAZK Member Retires

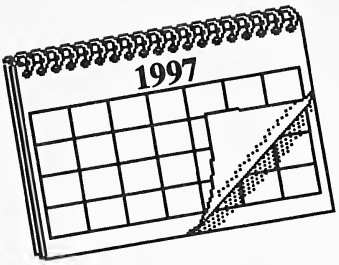
Judie Steenberg, long-time AAZK member and contributor/participant in many of AAZK's projects and programs, retired effective 23 July 1997 from the Woodland Park Zoo, Seattle, WA. During her zoo career, Judie has also worked at the Como Zoo in St. Paul, MN; The Dakota Zoo in Bismarck, ND; and the Topeka and Sedgwick County Zoos, located in Topeka, KS and Wichita, KS respectively. Judie was one of those instrumental in the early years of *Animal Keeper's Forum's* evolution and served on the AAZK Education and Videotape Project Committees, as well as being involved in many other national and local AAZK activities. She was the recipient of the 1983 Excellence in Zoo Keeping Award and the 1990 Meritorious Achievement Award from AAZK. Judie has been actively involved in the Tree Kangaroo SSP for many years and co-authored its Husbandry Manual. Anyone wishing to contact Judie may reach her at 3020 118th Ave. SE, Apt. B-204, Bellevue, WA (425) 401-6632.

AAZK/AKF Announcements: Members Please Note

AAZK members are asked to note the following:

- The area code for AAZK Administrative Offices has changed from 913 to 785. While this **does not** affect the 800 numbers, it does impact the Fax line. The AAZK Fax is now (785) 273-1980.
- The deadline for submissions for *Animal Keepers Forum* is the **10th** of the month **preceding** the month in which you wish your information to appear. This applies only to announcements, Chapter News, job placement listings, Information Please submissions and the like. Regular-length manuscripts and research papers, once accepted, are published as soon as possible, but authors need to keep in mind that the editor strives for a balance of subject matter in each issue and therefore there may be several months delay in articles being published. Authors are encouraged to submit their manuscripts on disk along with a hard copy. For Macintosh users, submit in Microsoft Word or Works; IBM users submit in Word for Windows, WordPerfect or WordStar.
- Postage costs for mailing *AKF* are continuing to rise and we anticipate a 5-9% increase in this expense over the next year. Each time we receive an *AKF* back from the Post Office due to an **unreported** change-of-address, it costs the Association **50 cents.** Help keep this cost down by reporting your change-of-address as soon as you know it. *AKF* is sent bulk-mail rate and is **not** automatically forwarded, so you may miss issues if you do not advise AO of address changes. These missed issues will not be sent gratis anymore.

Coming Events



Third International Conference on Environmental Enrichment - October 12-17, 1997 in Orlando, FL. For further information contact: Thad Lacinak, Sea World, Inc., 7007 Sea World Dr., Orlando, FL 32821 (407) 363-2651.

13th Annual Midwest Herpetological Symposium - October 17-21, 1997 in Shakopee, MN. Hosted by the Minnesota Herpetological Society. For further information contact: Bill Moss (612) 488-1383 or Liz Bosman (612) 476-0306 or e-mail MNHERPSOC@AOL.COM

American Association of Zoo Veterinarians Annual Conference - October 26-30, 1997 in Houston, TX at the Sheraton Astrodome. For conference information contact: Dr. Wilbur Amand, VMD, Executive Director/AAZV, 6 North Pennel Rd., Media, PA 19063; Phone (610) 358-9530; Fax (610) 892-4813.

The 25th Annual Conference of the International Marine Animal Trainers Association - October 26-31, 1997 in Baltimore, MD. Hosted by the National Aquarium at Baltimore. For information contact: Tim Sullivan, Brookfield Zoo, Seven Seas, 3300 Golf Rd., Brookfield, IL 60513; (708) 485-0263 ext. 464; Fax (708) 485-3532 e-mail: tsulli@manta.nosc.mil

18th Annual Elephant Managers Association Workshop - November 1-4, 1997 in Fort Worth, TX. For further information contact: Steve Clarke, Fort Worth Zoo, 1989 Colonial Parkway, Fort Worth, TX 76110; phone (817) 871-7415; Fax (817) 871-7012.

ChimpanZoo Annual Conference - November 15-19, 1997 in Little Rock, AR. For further information contact: Mark Hartmann, Ph.D., Dept. of Sociology/Anthropology, University of Arkansas, 2801 So. University Ave., Little Rock, AR 72204; phone (501) 569-3176; or e-mail MAHARTMANN@UALA.EDU

The Second Biennial Zoos Committing to Conservation Conference - December 11-14, 1997 in Tampa, FL. Hosted by Busch Gardens. Topics to include program development, biodiversity issues, case reports, and the creation of a database from existing *in situ* programs. For further information contact: Beth Grayson at (813) 987-5548.

AZA Schools - February 2-7, 1998 at Oglebay Park, Wheeling, WV. Courses include: Professional Management Development for Zoo and Aquarium Personnel, Applied Zoo and Aquarium Biology, Conservation Education Training, Principles of Elephant Management, Studbook I, Population Management, and Institutional Records Keeping. For further information contact; AZA Office of Membership Services, Oglebay Park, Wheeling, WV 26003, (304) 2160.

18th Biennial Pronghorn Workshop - March 23-27, 1998. Hosted by the Arizona Game and Fish Dept., in Prescott, AZ. For information contact: 18th Biennial Pronghorn Antelope Workshop, Richard A. Ockenfels, Chair, P. O. Box 41716, Phoenix, AZ 85080-1716; Phone: (602) 789-3379; Fax: (602) 789-3918; e-mail - rockcenfels@gf.state.az.us

1997 AAZK and Animal Keepers' Forum Awards

The following awards were presented at the 24th National AAZK Conference held in Houston, TX from 5-9 October 1997. The Certificates of Recognition and Appreciation are given by the AAZK Board of Directors. The Excellence in Journalism Awards are selected by the editorial staff of *Animal Keepers' Forum.*

Certificates of Appreciation

Given to individuals or institutions outside of the Association in appreciation for their efforts and contributions to AAZK projects and programs.

Houston Zoological Gardens, Houston, TX
For serving as the Host Institution for the 1997 AAZK Conference

Zoo Partners, Houston, TX
For their financial assistance for the 1997 AAZK National Conference

Pat Arnold, Takoma Park, MD
For her financial assistance with Project M. A. R. C.
(Making a Realistic Contribution - AAZK International Outreach)

Columbus Zoo, Powell, OH
For sponsoring the printing of the AAZK Enrichment Notebook
and
For sponsoring the printing of the 1997 Animal Data Transfer Forms

Stan Mays, Houston Zoological Gardens
For serving as Zoo Registrars Association Chair for the 1997 AAZK/ZRA National Conference

Certificates of Recognition

Given to individuals within the Association in recognition of their service to AAZK and their efforts on behalf of its projects and programs.

Ric Urban, and Christine Smith - Houston Zoological Gardens
For serving as Co-Chairs of the 1997 AAZK/ZRA National Conference

Jay Christie, Cohanzick Zoo, Bridgeton, NJ
For serving as the AAZK Chapter Products Coordinator

Todd Cleveland, Denver Zoological Gardens
For serving as the AAZK Keeper Accommodations List Coordinator

Mike Demlong, The Phoenix Zoo
For serving as the AAZK Exhibit Design Resource Notebook Chair

Mark de Denus, Assiniboine Park Zoo, Winnipeg, Canada
For revision of the L. I. N. K. Bulletin

Dale Frerking, Kansas City Zoological Gardens
For serving as Coordinator for the AAZK Staff Exchange Project

Lois Johannes, Los Angeles Zoo
For serving as Foreign Member Sponsorship Coordinator

Lesa Scheifele, Norwich, CT
For serving as AAZK International Affairs Coordinator

Kathy Kelly, Silver Springs, MD
For serving as the Coordinator for Project M. A. R. C. (Making A Realistic Difference - AAZK International Outreach)

Janet McCoy, Metro Washington Park Zoo, Portland, OR
For her service from 1990-1997 on the AAZK Board of Directors

Michael Illig, Metro Washington Park Zoo, Portland, OR
For his service from 1996-1997 on the AAZK Board of Directors

Distinguished Service Plaque

was presented to

The Greater Houston Chapter of AAZK
For serving as the AAZK/ZRA 1997 National Conference Host Chapter

Excellence in Journalism Awards

Outstanding Recognition: "Hand-rearing Scarlet Ibis at Moody Gardens" October 1996 Animal Keepers' Forum

Jim Dobberstine and Pat Sharkey
Moody Gardens, Galveston, TX

Outstanding Recognition: "The Drop-Chute Hoofstock Restraint as an Alternative to Chemical Immobilization at San Diego Wild Animal Park" December 1996 Animal Keepers' Forum

Adam Petrovsky and Andy Blue
San Diego Wild Animal Park, Escondido, CA

Outstanding Recognition: "Nectar Feeding as an Enrichment Technique with Island Flying Foxes"
January 1997 Animal Keepers' Forum

Dana LaBlanc
The Lubee Foundation, Gainesville, FL

Outstanding Recognition: "Conditioning a Greater One-Horn Rhino to Accept Foot Treatment without Anesthesia"
June 1997 Animal Keepers' Forum

Jim Gregory and Veronica Watkins
Whipsnade Wild Animal Park, United Kingdom

Outstanding Recognition: "Inhlovudawana or Little Elephant: Managing Warthogs through Operant Conditioning"
1996 AAZK Conference Proceedings

Victoria Cloninger and Jeffrey Phillips
North Carolina Zoological Park, Asheboro, NC

Outstanding Recognition: "Creation of an Age-Diversified Gorilla Group Through Alternative Means"
1996 AAZK Conference Proceedings

Elizabeth Armstrong, Charlene Jendry, Dianna Frisch, Susan White, Debbie Elder and Adele Absi
Columbus Zoological Gardens, Powell, OH

Gail Laule, Active Environments, Inc. , Lompoc, CA

Outstanding Cover Art for 1997

Western Lowland Gorilla (Gorilla g. gorilla)
June 1997 Animal Keepers' Forum

Dean Simonson
Zoological Society of San Diego, San Diego, CA

REACTIONS

A Question and Answer Forum for the Zoo Professional on Crisis Management

By William K. Baker, Jr., Zoologist
Lufkin, TX

QUESTION
Do colognes and perfumes effect the behavior of captive animals in a negative way and pose a threat to personal safety?

COMMENTS
Animals have a long history of being influenced by olfactory conditions in their environment. Over 200 years ago John Ray noted that domestic cats (*Felis catus*) were attracted to catnip (*Nepeta cataria*) when the plant was bruised or withered. These observations were later reported and confirmed by Phillip Miller (1759). Historically, a wide variety of animals have been observed that scent mark to dilineate territorial boundaries and to advertise activity levels. For numerous species, especially felids, scent plays an important role in the greeting and identification process. Even today, Zoo Keepers readily recognize the value of using scents and spices for environmental enrichment.

So, yes, scents play an important role in the animal world. But, the question remains, do manmade scents play a role in the captive animal environment? In my experience I would have to say yes. Colognes and perfumes may be manufactured through the refinement of a natural substance or the use of artificial modeling in the laboratory. Either way, the purpose is to illicit an emotional response. The only problem is that they have an area effect, and not everyone appreciates a scent to the same degree. In fact, some people are allergic to designer fragrances. This makes it easy to carry this argument to the next level and apply it to exotic animals, especially since they're sensitive to changes in their environment.

Since mammals have a well-developed sense of smell and that's where my experience is, I'll restrict my comments to this area. The following incidents are based on personal observations throughout my career. As a result, they are subjective and dependent on the variability of species and individual animal personalities.

INCIDENTS

A zoo keeper was bitten by a black and white ruffed lemur (*Varecia variegata*). The only factor that was different from established daily procedures was that this was the first time she had ever worn perfume to work.

A herd of greater kudu (*Tragelaphus strepsiceros*) followed a zoo keeper and attempted to eat her hair when she used sour apple shampoo and, on a separate occasion, when she used mango creme rinse.

A herd of Dorcas gazelle (*Gazella dorcas*) followed a zoo keeper throughout an exhibit scenting the air and surrounded her when she used a banana-scented shampoo.

A herd of sable antelope (*Tragelaphus niger*) reacted aggressively to a zoo volunteer who was wearing a heavy musk cologne.

A female cougar (*Felis concolor*) reacted negatively to a zoo keeper and refused the shift into the night house whenever he wore cologne.

A group of ring-tailed lemurs (*Lemur catta*) jumped on a visitor's shoulders and began grooming her hair. She had used an herbal shampoo.

CONCLUSION

Anytime a new variable is introduced into a stable environment, the chance that it could adversely effect an animals' behavior should be considered. While it is easy to refrain from using colognes and perfumes in the work environment, it can be challenging to eliminate scented products altogether. Most soaps, lotions, and even laundry products are often heavily scented. Thankfully, there are numerous manufacturers that now offer unscented products.

NEXT MONTH: Can the type of footwear worn in the zoo keeper work environment make a difference in personal safety?

If you would like to submit a question for this column or have comments on previously published material, please send them to: Reactions/AKF, 635 S. W. Gage Blvd., Topeka, KS 66606-2066.

(About the Author: Since 1985 Bill has been active in the fields of sceence, zoology and wildlife management. His education and expereince include a B. S. in wildlife management and post-graduate work in zoology; Lab and Museum Assistant; Shoot Team leader, ERT Member, and Senior Keeper and Large Mammal Keeper at various AZA facilities. His area of research is crisis management in zoological institutions, which draws upon practical experience and training as a Rescue Diver, Hunter Safety Instructor, NRA Firearms Instructor, and Red Cross CPR/ First Aid Instructor.)

New & Renewing AAZK Professional/Institutional/Contributing Members

New Professional Members

Sheri L. Rothermel, **Utica Zoo (NY)**; Brian M. Altadonna, **Baltimore Zoo (MD)**; Christopher Kwilecki, **Zoo Atlanta (GA)**; Nerva L. Gonzalez, **Miami Seaquarium (FL)**; John I. Hendricke III, **Miami Metro Zoo (FL)**; Barbara Howard, **Disney's Animal Kingdom (FL)**; Courtney Cuttrell, **Knoxville Zoo (TN)**; Gary Green, **Clinton, MS**; Tracy Williams and Susan M. Craycroft, **Louisville Zoological Gardens (KY)**; Donna Duncan, **Washington Park Zoo (IN)**; Nicole Robinson and Eric T. Walter, **Binder Park Zoo (MI)**; Jodi Den Uyl, **John Ball Zoo (MI)**; Chelsea Brydl, **Curtis, NE**; Anthony Davi, **Aquarium of the Americas (LA)**; Elizabeth Ann Furlong, **Audubon Institute (LA)**; Jason McClure, **Caldwell Zoo (TX)**; Deborah McCowan, Debra Nevarez, and Jesus H. Arenas, **El Paso Zoo (TX)**; Melissa Glasser and Aleksei R. Saunders, **Denver Zoo (CO)**; Holly Halsch, **The Phoenix Zoo (AZ)**; Gretchen A. Hauer, **Rio Grande Zoo (NM)**; and Amy Canova, **Marine World Africa USA (CA)**.

New Contributing Members

Stephen D. Rosenthal,
Member of San Diego Zoo
AAZK Chapter, San Diego, CA

Renewing Contributing Members

Carol N. Wright, Dallas Zoo, Dallas, TX
Jim Fleshman, Director, Abilene Zoological Gardens, Abilene, TX
Susan Nolan Dickinson, Denver, CO
Susan Moy-La Veau, Lincoln Park Zoo, Chicago,IL

New Institutional Members

Sea World of Florida, Orlando, FL

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Barbara Manspeaker -
Administrative Secretary
Susan Chan -
Managing Editor AKF
Orca -
Office Cat

Office Hours: 9:00 a.m. - 3:00 p.m. CDT

ABC's . . . . .

Animal Behavior Concerns & Solutions

A Question and Answer Forum for the Zoo Professional

By Diana Guerrero, Independent Behavior Consultant,
Ark Animals of California, San Diego, CA

COMMON TRAINING ERRORS 101:
Understanding Applications of the Bridge and Bridging Criteria
Part Two: Questions

QUESTION: What is your opinion about multiple trainers working with one animal?

ANSWER: It seems to be less important for veteran animals to have one specific trainer, but I find it often critical to have only one trainer working on teaching a new behavior and finishing that training. This is important to do before turning the behavior over for others to work. It is also important for that trainer to sign the other trainers off on the behavior in order to maintain the criteria established.

QUESTION: Why does it seem more critical for some animals to have one trainer while it does not seem to matter with others?

ANSWER: Good question! First, there is the need for consistency of approach that training new behaviors (or new animals) requires for success. Once a behavior is secure, or a routine is stable, there is more margin for error. Although you don't want to make many mistakes, they can happen at a more advanced stage without causing a total collapse; this is because things are already stable and understood. Because new behaviors and animals take a while to become established, it is more critical to have consistency in the beginning.

QUESTION: Does it matter if there is a difference between training or bridging styles?

ANSWER: When used in training a new behavior or a naive animal, yes, it is more of a necessity. It is important to have clear and consistent communication and guidelines to avoid frustrating or confusing an animal, and in order to achieve success. Accountability to each trainer can vary, and care needs to be taken since any lack of consistency can lead to increased frustration, confusion, and aggression because of it. However, higher intellect animals seem to figure out the difference between the trainers and their styles.

QUESTION: Is there a difference between a long and short bridge?

ANSWER: This is a matter of opinion. There can be - it actually depends on the application. It is also a matter of preference with each individual's training

style. I have seen more advanced trainers use the bridge to give the animal feedback in a reinforcing manner. Some trainers will use quick bridges during regular training, however if a break-through is made, will offer a long bridge quite different from their normal pattern. This will often signal successful completion and is paired with a higher ratio of primary reinforcement. Care should be taken in this type of application. The magnitude of reinforcement can directly affect the response the animal gives to the trainer for the better. If this method is abused or confused, however, it can become meanningless and have an adverse affect instead.

QUESTION: What do you think of release words or cues?

ANSWER: With terrestrial and domestic animals I have used a short bridge as a reinforcer and another cue for ending the behavior or session. This can allow more control and create less anticipation by an animal. This application is most often used to build longevity into stationary behaviors. It is more common in domestic animal training than some other areas. Again, these type of choices will depend on the individual animals, the species involved, and the skill of the people working with them.

QUESTION: What do you think about variable reinforcement?

ANSWER: In more advanced applications, many trainers will prefer to only give primary reinforcement when the animal has completed the tasks at hand at the desired level. To accomplish this successfully, a fairly extreme variable reinforcement schedule is used by applying the secondary reinforcer (bridge) throughout the session. Care must be taken that excessive use of this does not happen since it could diminish the association between the secondary and primary reinforcer.

My experience is that the animals like the variety, and the challenge of variables; it seems to stimulate more interest and the drive to meet the demand. Animals will often perform better and learn faster if they have that and consistent feedback. Feedback can be either verbage from the trainer or through bridging itself.

QUESTION: Do you have any suggestions for handling stress situations or new conditions/locations with animals?

ANSWER: This could also be another article! In higher level stress situations (or higher distraction levels) I will increase the primary reinforcement and use easier behaviors to obtain comfort and successful performance from the animal before moving to more difficult tasks. In these cases I bridge more and sometimes will often go back to basics.

Another critical factor to seeing you successful in these situations where you could lose control is the trust factor, or bond, that the animal has with the trainer. Many times when an animal is under stress they will not respond to

food rewards or traditional approaches that work well otherwise. This difference is the rapport and trust that takes time to establish with an animal.

If you would like to submit a behavior question/scenario for discussion in this column, please use the guidelines published in the Aug. 1997 AKF (pg. 348-350). Requests for behavior evaluations should be sent to Diana Guerrero at Ark Animals, Inc., P. O. Box 1154, Escondido, CA 92033-1154 or directed to her e-mail address listed below.

About the Author: Since 1978 Diana has been active both in the U. S. and England working with zoos, private collections, an oceanarium, a marine aquarium, and other animal-related organizations involving captive wildlife. She has a broad base of animal experience involving movie & television training, zookeeping, show performances with live animals, education, behavior management, modification and enrichment, rescue and rehabilitation as well as captive breeding and management of endangered species. She is currently working as an Animal Behavior Consultant and Trainer with both exotic and domestic animals, she has authored numerous articles on animal behavior and training. If you have questions for Diana, you may contact her at 1-800-818-7387 or via the email listed below. ***NOTE****: The Ark Animals' Website has completed the change to Electronic Magazine Format. The "Ezine" features articles related to captive animal behavior, enrichment, conservation, and similar topics. The publisher welcomes electronically submitted articles (previously published or new work). Deadline is the 10th of the month previous to publishing. Interested parties may contact the publisher at arkabc@arkanimals.com Site address is http://www.arkanimalS.com*

The Rio Grande AAZK Chapter would like to offer our BFR T-Shirts to all AAZK members. They are white with a black design and are available in Lg. and X-Lg. and sell for $12.50 each. If you are interested please call Rhonda Saiers at (505) 254-7833.

Legislative Update

Compiled by Georgann Johnston
Legislative Advisor
Sacramento, CA
1-800-338-7348

CITES Update: Listing Changes

In the August issue of AKF, this column reviewed some of the major decisions reached at the 10th Convention of Parties for CITES. A description of the CITES Appendices is also contained in that column. A number of readers have called asking for information regarding species which were not discussed in the August issue and, in response to those requests, a brief summary of CITES listing and delisting decisions follows.

The following new species were added to the Appendices of the CITES treaty:

MAMMALS: Hairy armadillo (*Chaetophractus nationi*) is now Appendix I. BIRDS: Straw-headed bulbul (*Pynconotus zeylanicus*); Silver-eared mesia (*Leiothrix argentauris*); Red-billed leiothrix (*Leiothrix lutea*); Omei shan liocichla (*Liocichla omeiensis*); Seven-colored tanager (*Tangara fastuosa*); Green avadavat (*Amandava formosa*); Hill myna (*Gracula religiosa*) are now Appendix II. REPTILES & AMPHIBIANS: Painted terrapin (*Callagur borneoensis*) is now Appendix II.

The following species were deleted from Appendix II of the CITES treaty:

MAMMALS: Mountain pygmy possum (*Barramys parvus*); Bennett's tree kangaroo (*Dendrolagus bennettianus*); Boongary (Dendrolagus lumholtzi); Collared peccary (*Tayassu tajacu*) deleted Mexican population only. BIRDS: Black-breasted buttonquail (*Turnix melanogaster*); Plains wanderer (*Pedionomus torquatus*); Buff weka (*Gallirallus australis hectori*).

The following species had a change of status:

MAMMALS: African elephant (*Loxodonta africana*) populations in Botswana, Namibia and Zimbabwe were downlisted and moved from Appendix I to Appendix II; Vicuna (*Vicugna vicugna*) certain populations in Argentina and Bolivia were downlisted from Appendix I to Appendix II and the use of the species' wool was approved in Peruvian handicrafts; Wood bison (*Bison bison athabascae*) downlisted from Appendix I to Appendix II . BIRDS: Green-cheeked Amazon (*Amazona viridigenalis*) and Kara tau argali (*Ovis ammon nigrimontana*) both uplisted from Appendix II to Appendix I. REPTILES & AMPHIBIANS: Broad-snouted Caiman (*Caiman latirostris*) was moved from Appendix I to Appendix III; Nile crocodile (*Crocodylus niloticus*) populations in Madagascar and Uganda will be maintained on Appendix II while Tanzania populations had an increase in the quota for skins of wild-caught animals; Bengal monitor (*Varanus bengalensis*) and the Yellow monitor

(*Varanus flavescens*) Bangladesh populations were downlisted from Appendix I to Appendix II.

Proposals regarding the following species were either withdrawn by the sponsoring country prior to voting or were rejected by the Convention members:
MAMMALS: Jaguar (*Panthera onca*); Grey whale (*Eschrichtius robustus*); Minke whale (*Balaenoptera acutorostrata*); Bryde's whale (*Balaenoptera edeni*); Brown bear (*Ursus arctos*). BIRDS: Northern helmeted curassow (*Pauxi pauxi*); Southern helmeted curassow (*Pauxi unicornis*); Black-billed Amazon (*Amazona agilis*); Yellow-crested cockatoo (*Cacatua sulphurea*); Uvea horned parakeet (*Eunymphicus cornutus uvaeensis*); Rimatara lorikeet (*Vini kuhlii*); Blue lorikeet (*Vini peruviana*); Ultramarine lorikeet (*Vini ultramarina*); Writhed-billed hornbill (*Aceros waldeni*); Java sparrow (*Padda oryzivora*). REPTILES & AMPHIBIANS: Alligator snapping turtle (*Macroclemys temminckii*); Map turtles (*Graptemys spp.*); Hawksbill turtle (*Eretmochelys imbricata*); Timber rattlesnake (*Crotalus horridus*).

USFWS Investigates CITES Enforcement Regulations

The U. S. Fish and Wildlife Service (USFWS) is considering a significant overhaul of the rules and regulations initially passed in 1977 (amended in 1980) which cover the implementation of CITES in the United States. The USFWS is the federal agency charged with monitoring the import, export and trade in species listed on the three Appendices to the CITES convention and carries out this obligation by enacting regulations found in the U. S. Code of Federal Regulations, Title 50, Part 23.

As stated in the formal notice of intent to amend Part 23, the USFWS has taken the position that as interpretive resolutions to the Convention have been adopted at the various CITES conferences, these resolutions need to be given effect through the creation and/or modification of U. S. federal regulations. In addition, the USFWS also stated that this is also an appropriate time to develop new policies and procedures through the statutory authority given to the Service by Congress through the Endangered Species Act.

The Service intends to continue to fully consider public input on the development of U. S. policy positions, and invites comments as to how the Service can most effectively receive information from the public on CITES policy position formulation. Comments and other information should be sent to Kenneth Stansell, Chief, Office of Management Authority, 4401 N. Fairfax Drive, Room 430, Arlington, VA 22203. Further information regarding the exact portions of Part 23 subject to review and modification can be obtained by contacting Bruce Weissgold or Susan Lieberman, Office of Management Authority, USFWS, at telephone (703) 358-2093.

Source: Federal Register Online, 5 August 1997, volume 162, number 150

Harlequin Duck Subject of ESA Study

The U. S. Fish and Wildlife Service (USFWS) is gathering more information regarding eastern U. S. population of the harlequin duck (*Histrionicus histrionicus*) to determine whether or not that species should be listed under the Endangered Species

Act. There are four major recognized populations of the harlequin - Pacific, Greenland, Iceland, and eastern North America. It is only the eastern U. S. population that is the subject of this pending study.

One major goal of the study is to determine whether or not the eastern population is actually distinct from the three other populations from a genetic diversity standpoint. The study will also consider population numbers and the exact locations of breeding and wintering ranges.

The study comes as the result of a petition filed by the Northern Rockies Biodiversity Project located in Montana, which pointed out that these sea birds are unique in their breeding strategies - nesting along turbulent rivers and streams - and that the colorful plumage of the males makes them a target for hunters. The birds range from Quebec, Newfoundland and New Brunswick down through Massachusetts and into Virginia and North Carolina. Christmas bird counts have also revealed birds venturing as far west as Wisconsin and Michigan.

More information about the study may be obtained by contacting the Field Supervisor, New England Field Office, USFWS, 22 Bridge St., Unit 1, Concord, NH 03301-4986.

Source: Federal Register Online 7 August 1997, vol. 62, issue 152.

European Nationas Contribute to South African Wildlife College

The South African Wildlife College (SAWC) located in the Northern Province has received financial support from the governments of Germany, Denmark, and the Netherlands. Those countries have donated money to secure the college's first two years of operation, according to Peter van Darkessgoed, the head of development of cooperation between the Netherlands and South Africa, speaking from the Netherlands embassy in Pretoria.

The SAWC was initially started by the World Wildlife Fund of South Africa with its stated goal to be the first facility dedicated to conservation and environmental learning in the southern African sub-continent. The college is set to officially open its doors in September 1997, but it has already offered four short courses for provincial and national park managers from countries such as Malawi and Uganda. It is hoped that within the next year the college will be able to offer a certificate course for managers covering conservation, business and even community-related issues (such as conflict management) for the staff of various public parks located in southern African countries.

The financial support from the three European governments was aided by donations from 54 South African companies, trusts and individuals. Contributors have been told that the SAWC hopes to become a major role player in changing the sub-continent's tourism approach to wildlife and park management to one of usable sustainable development.

Source: Bushcraft Mag-e-Zine, 25 August 1997, courtesy of the Pretoria News.

Husbandry and Management of the Southern Black Rhino (*Diceros Bicornis Minor*) at White Oak Conservation Center

By
Lonnie McCaskill, Lead-Keeper Rhino*
White Oak Conservation Center

**The author is currently a Zoological Manager at Walt Disney's Animal Kingdom in Orlando, FL*

Since 1984, White Oak Conservation Center has been involved in rhino conservation, both *in-situ* and *ex-situ*. White Oak supports projects with all five species of rhinos through involvement and participation with the I.R.F. *(International Rhino Foundation).* Howard Gilman Foundation is a founding member and major contributor of the I. R. F. and John Lukas, Director of White Oak Conservation Center, is currently serving as president of the I. R. F. White Oak Conservation Center is involved in *ex-situ* conservation of the southern black rhino (*Diceros bicornis minor*) and the southern white rhino *(Ceratotherium simum simum).* In addition, White Oak Conservation Center currently supports *in-situ* research in nutrition, behavior and physiology.

Currently, White Oak's black rhino population stands at eight animals ranging in age from two months to 20+ years. In April of 1992, White Oak received its first female, *Mwenda*, through an International Rhino Foundation (IRF) partnership with the government of Zimbabwe. In July of 1994, Zimbabwe Parks and Wildlife Department decided to place two males on loan to White Oak as an addition to the U. S. southern black rhino population. The two males, *Clem* and *Tortoise,* originated from a private reserve in Zimbabwe where drought conditions depleted valuable nutritional resources and threatened their lives. On 19 July, 1995 White Oak received two additional females. *Ngwewte* was received on loan from the Ft. Worth Zoo via Calvin Benson's La Coma Ranch in Texas. The second, *Thombi*, arrived on loan from Calvin Benson's La Coma Ranch. Since their arrivals all three females have produced calves.

HOUSING

White Oak's southern geographical location makes it favorable for its black rhino and white rhino conservation breeding programs. The mild winters allow the rhinos to remain outside year round with no need to separate animals or lock them in barns. The rhinos are provided with shelters and infra-red heaters and have experienced temperatures in the 30s for short periods (not more than 12 hours) without any problems. Also favoring our breeding programs, is the resource of available land to construct spacious enclosures.

Presently, White Oak has three main breeding and rearing pens dedicated to black rhino management. The main enclosures have a vehicle access, mud wallows, and numerous shade trees with welded pipe protectors. There are logs and rocks for rubbing and scratching. The shelter for shade and rain protection has a soft sand substrate for comfort and dry wallowing. The largest pen (Figure 1, diagram A) is 1.15 hectares (2.85 acres) with a divided corral at one end and an adjoining smaller enclosure at the other end. Each corral is 27.45 meters (90') wide and 18.3 meters (60') deep. One corral and adjoining enclosure lie within the main perimeter fence. The second divided corral lies outside, but connects with the perimeter fence with access to the main enclosure through two gates. The perimeter fence and corrals are constructed of 7.62cm (3") horizontal welded pipe that is 1.63 meters (6') high with a 30.48cm (1') separation between pipes. There are vehicle access gates to the corrals from outside of the main pen's perimeter fence. The animal access gates enter the main pen from the corrals. The fence line that divides the corral also has an animal gate allowing access to either side.

The second enclosure (Figure 1, diagram B) is .761 hectares (1.88 acres) with two corrals, one divided 23.18 x19.22 meters (76' x 63') and one single 16.165x 25.62 meters (53' x 84'). The perimeter fence is constructed of 1.52 meters (5') I-beams with 2.29 cm (3/4") steel cables running horizontally, 40.64 cm (16") apart. The steel cable is covered, with 2.54 cm (1") P.V.C. pipe, to prevent notching of horns. It is very effective. The single corral has a vehicle access gate along the perimeter fence and two animal access gates into the main enclosure. The divided corral has two vehicle access gates, one entering from inside the main pen on one side and one entering outside the enclosure on the opposite. The fence dividing the corral also has two animal access gates leading to either side.

The third pen (Figure 1, diagram C) lies adjacent to the second and is similar in construction to the second pen. There is a 1.83 meters (6') separation between perimeter fence lines with a dual gate access between main enclosures. There is a .915 meter (3') keeper space between the chain link and perimeter fences of the pen. The remaining fence line is an 2.44 meter (8') stockade fence serving as a visual barrier for adjacently housed hoofstock species. The enclosure is approximately a .4047 hectare (one acre) rectangle with one corral 24.4 x 19.83 meters (80' x 65'). The corral is constructed with 7.62cm (3") round horizontal welded pipe that is 1.37 meters (4' 6") high. There is vehicle access gate entering from outside the enclosure and two animal access gates into the main enclosure.

All but one corral has two shelters. One is a cement slab floor for feeding with an automatic water fixture on, or near, the slab. The other shelter is a sand substrate with a heat source. Bedding hay is provided in cold weather.

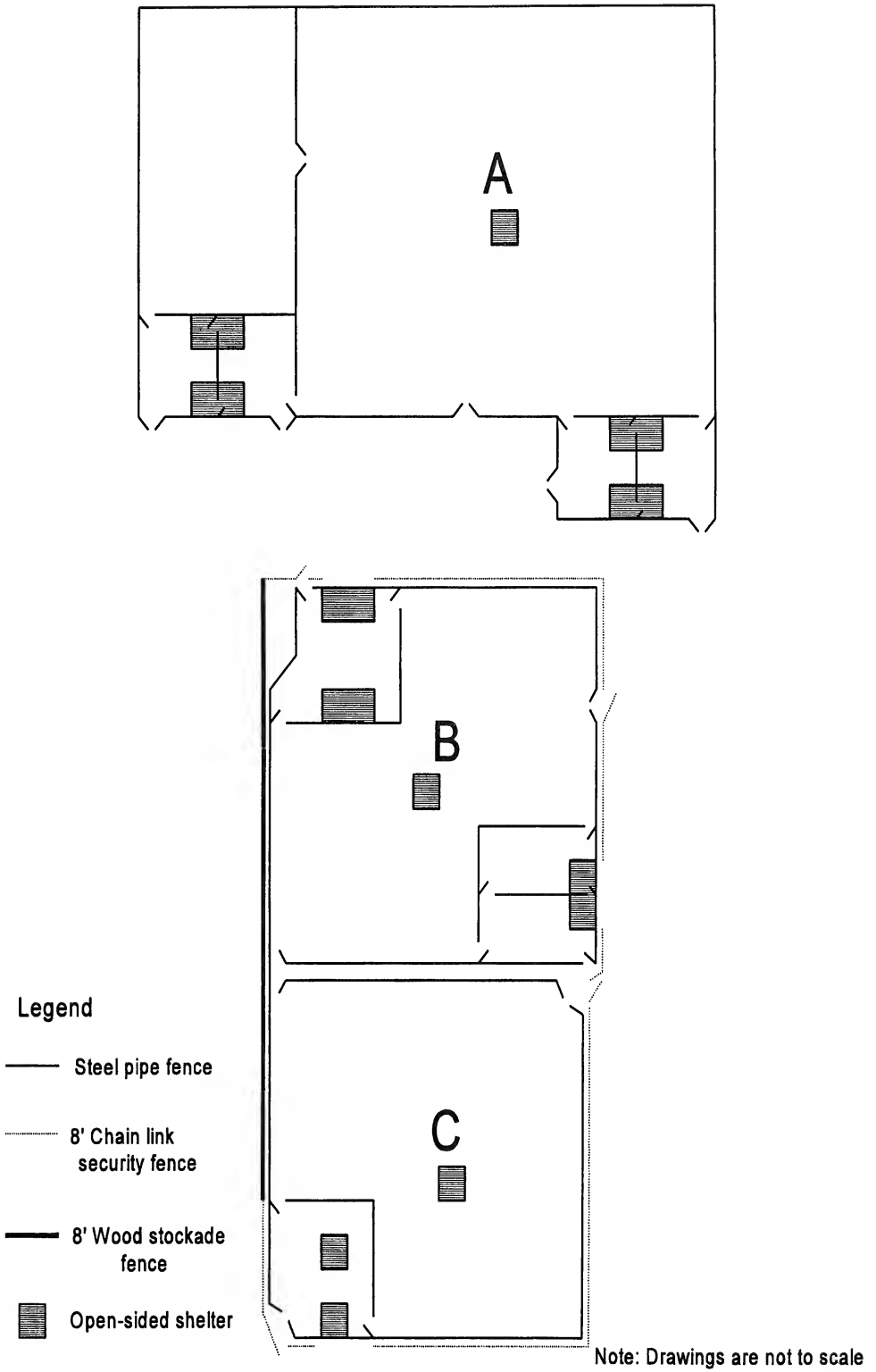


Figure 1: ***Black Rhino Enclosures at White Oak Conservation Center***

INTRODUCTIONS

Black rhinos are notorious for their aggressive behavior toward each other, especially during introductions and courtship. White Oak Conservation Center's large enclosures are beneficial in letting pairs work out their differences during these rituals. To ease the aggressiveness during these events, White Oak Conservation Center has several methods that have been successful.

One method used for first time introductions is to alternate the male and female in a main enclosure so they have visual and tactile contact with each other. The individuals are rotated daily so they can investigate dung middens, urine odors, and pathways. As the female cycles into estrous, both rhinos begin to frequent the common fence line. The female will often press her rump against the bars of the corral allowing the male to investigate her vaginal area. She also squirts urine. When the female is in estrous, we introduce the pairs in the main enclosure. All corral gates are closed so if there is aggressive behavior, the submissive rhino is unable to get into the corral and get cornered or hurt itself. We then allow both rhinos to share the main enclosure during the day. If all is going well with no overt aggressiveness, we allow the pair to remain together day and night. Using this method, we have introduced an additional female successfully to the pair, resulting in pregnancies in both females. All rhinos are separated during feedings to avoid conflicts. As the females neared parturition they become less tolerant of the other rhinos and are separated into corrals. During the separations the trio can be rotated, so none are locked into a corral for an extended period.

Another introduction method, is to introduce a male into the female's enclosure for several days prior to introducing the pair. On the day of the introduction, the male is locked in an adjoining corral and the female is given access to her original enclosure, again, closing gates on all corrals. The male is then given access to the female. The pair is separated at night until breeding occurs. This has proved equally successful, even without the female in estrous.

MOTHER AND CALF MANAGEMENT

Pairs remain together until the pregnant female becomes intolerant of the presence of other rhinos in the same enclosure. At this time they are separated and rotated daily into the main enclosure. By close observation of the female (i.e., udder development, vaginal dilation), and checking breeding dates, we can roughly determine an estimated parturition time.

At this point, the female is locked into the corral. An 45.72 cm (18") high plywood barrier is placed around the bottom of the corral so the calf does not step through the bars. When the calf is one to two weeks old, mother and calf are given access to the main enclosure during the day and locked back in a corral at night. When the calf has grown enough that it can't escape the main enclosure, the calf is given full access to the corrals and main pen.

When the calf is 6-8 months old, we begin separating the calf from the mother for short periods, gradually increasing separations. For example, separations may begin one hour a day the first week and two hours a day the second week. This is continued until they are separated at the morning feeding and put back together at the afternoon feeding. This enables the female to be reintroduced to the male earlier, therefore, shortening the time between breeding and births. At one year of age, the calf is separated permanently.

NUTRITION AND BROWSE

White Oak Conservation Center, with the assistance of Dr. Ellen Dierenfield and Nutrena Feed Company, is currently participating in the development of a feed specifically formulated to the requirements of Black Rhinos.

Dr. Pete Morkel of the South African Parks Board brought Boskos feed to our attention. Boskos, Afrikaan for "bush feed", is made from problem bush and Acacia overgrowth in rhino habitats. It is imported from WES Enterprises in South Africa. White Oak's use and evaluation of this feed is in the early stages of investigation.

At the time of this article each adult black rhino receives one flake each of timothy, alfalfa and Sudan hay in the morning. During the afternoon feeding each adult receives the same hay ration along with 2% animal weight (10-12 lbs.) of Boskos feed, four apples and four carrots. We pour one liquid ounce of Mazuri® 5M84 Vitamin ETPG5 20% solution, per animal, over feed. We adjust diets to each animals needs, i.e., activity levels, lactating females and/or health status.

In addition to the above diets, White Oak Conservation Center also gives browse year round. In the winter, browse is given 2-3 times a week. During the growing season, browse is given on a daily basis. These are the browse species we currently feed:

Acacia	*Acacia ssp.*
Elm	*Ulmus japonica, U. minor*
Bamboo	*Ssp.*
Willow	*Salix ssp.*
Banana	*Ssp.*
Mulberry	*Morus alba, M. nigra*
Sweet gum	*Liquidambar styraciflua*
Red Bay	*Persea borbonia*
Tupelo	*Nyssa sylvatica*
Gall Berry	*Ilex glabra*
Pine Cones	*Pinus ssp.*

HEALTH MANAGEMENT

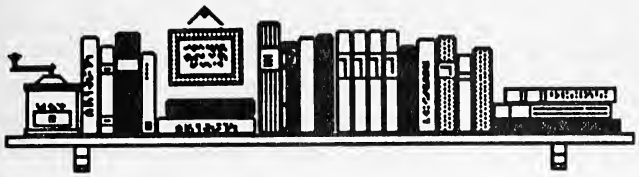
White Oak Conservation Center performs routine health screening and preventative medicine to minimize problems. As a part of this preventative medicine program, all rhinos are screened for parasites quarterly and treated as needed. All rhinos that are more than one month old are vaccinated annually for leptospirosis, Tetanus toxoid, eastern equine encephalitis and tested for tuberculosis.

Three of our adult black rhinos have been conditioned for routine blood collection without restraint or immobilization. It is believed that lack of proper nutrition is responsible for causing a number of health problems in black rhinos. White Oak Conservation Center will continue investigating the development of feeds and will support research in this area to improve the health of rhinos.

ACKNOWLEDGMENT

White Oak Conservation Center's commitment to the conservation of rhinos includes all five species. With the support of Howard Gilman and Howard Gilman Foundation it has been the vision of our director, John Lukas, that has made this conservation effort possible. I am proud to have been a part of White Oak Conservation Center staff and to have had the opportunity to work with this group of rhinos. I would also like to thank Connie Webb, Cyd Teare and John Flemming for their assistance in the preparation of this article.

For more information regarding White Oaks rhino programs, please contact: Steve Shurter, Collections Manager at White Oak Conservation Center,Yulee, Florida.



Book Review

Nature's Keepers
By Stephen Budiansky
The Free Press, New York, NY 1995
310 pgs.

Review by Eric R. Eaton
AAZK Associate Member
Cincinnati, OH

The title might suggest that this book is specifically about zookeepers, but it treats the whole spectrum of wildlife, indeed ecosystem management. Much important work is introduced here while more popular assertions are called into question. Budiansky issues a wake-up call to those environmentalists living in what he calls the dream state of "nature worship".

The first half of Nature's Keepers skillfully chronicles the fabrication of the myth of unspoiled wilderness and its transformation into the modern environmental movement. Example after historic example is cited as to how mankind has always impacted his environment and altered the landscape. Budiansky dispels the notion of the native Americans living in harmony with nature, reminding the reader that Indians used fire constantly to keep even forested areas in a open, park-like state; and, given the opportunity, hunted far more game than necessary to meet a given degree of need.

Even without human intervention, ecosystems are not inherently stable, inexorably progressing toward a "climax" community. This may come as a shock to those schooled in traditional ecology, but regular disturbances such as fire, flood, and hurricane seem to be the rule in nature's reality. Volcanoes can essentially pave-over an area, yet plants and animal recolonize. The introduction of exotic species, and removal of native ones via predator control and culling, are also disturbances. While the author abhors the extremes of such practices in the past, he applauds the idea of taking an active role in managing populations of organisms.

In Budiansky's opinion, the immaturity of ecology as a hard science is to blame for our failure in understanding and managing natural resources. He sees mathematics, especially "population viability theory", and statistics as the only saviors. The graphs that appear throughout the book reinforce this belief.

At the risk of seriously offending those who treat the words and wisdom of E. O. Wilson, Paul Ehrlich, and even Al Gore as gospel, he argues against overblown estimates of species extinction rates, and the "outdated" theories of island biogeography and the species/area curve. This may be hard to stomach, but Budiansky reaches his conclusions through exhaustive and unbiased library research, and tames his own language with the use of humorous analogies. His comments are sometimes stern, but never disrespectful.

The author advocates experiment on a grand scale, pointing to the success of tallgrass prairie restoration efforts, and the intensive management of grouse moors in Scotland as the results possible with a commitment to action rather than pursuing the "hands-off, let nature take its course" policy currently in vogue.

Budiansky's bottom line is that, like any worthwhile endeavor, protecting, preserving, and managing nature takes **work**. It takes careful assessment of conflicts, and bold responses. It takes a willingness to get one's hands dirty, to dare to light the prescribed prairie burn, or banish the burros from a delicate desert canyon. Doing nothing is as much a crime as acting with total irresponsibility.

The zookeeper's role need not be limited to re-stocking animal populations in the author's dynamic, but intensively controlled world. We need to act in our own urban and suburban communities because biodiversity begins at home, and in the garden, and we are among the best resources and advocates for that kind of basic ecosystem management.

Sparrows and Buntings: A Guide to the Sparrows and Buntings of North America and the World
By Clive Byers, Jon Curson and Urban Olsson 1995
Houghton Mifflin Co., 215 Park Ave. S., New York, NY 10003
334 pgs. Hardcover price: $40.00

Review by Kelly Dwyer Ryder
Aviculturist II
Lowry Park Zoological Gardens
Tampa, FL

Sparrows and Buntings is an excellent identification guide encompassing the entire 110 species forming this diverse group. The species covered occur in South, Central and North America, Europe, Asia and Africa. There are a few Asian buntings and tropical sparrows whose complete plumage variations are published here for the first time.

The introductory segment covers identification strategies, taxonomy, breeding biology, and hybridization. Each account in the systematic section is defined in detail, with more complex topics discussed in layman's terms. To ensure precise identification, characteristics to focus on are highlighted to distinguish between similar species and subspecies.

The main portion is devoted to full color plates and systematics of each species. The illustrations are complete with every plumage found in each species (i.e. non-breeding,/breeding, male/female, etc.). The text, which is broken down by genus, covers several key points including identification, moulting and aging, voice, habitat, nesting habits, diet and status. Sketches are provided within the text for more difficult topics. A distribution map accompanies each species' distribution and movement account. Every species section concludes with a convenient list of references for that particular species. The length bibliography includes additional references.

Any professional aviculturist or avid birder should enjoy the concise information found in Sparrows and Buntings. Other books in this Helm Series of International Bird Guides include Crows and Jays, Seabirds, Warblers of the Americas, Waterfowl, and Woodpeckers. Any of these guides would make an excellent addition to a personal or professional library.

Mitsuaki Iwago's Penguins
by Mitsuaki Iwago
Chronicle Books
85 Second Street, San Francisco, CA 94105
Softcover, 120 pgs. Price: $19.95

Review by Michael Davis, Animal Keeper
Miller Park Zoo, Bloomington, IL

Mitsuaki Iwago's Penguins is a very impressive photo collection of penguins in their native habitat. For any penguin or Antarctic fan this book would be a must own item.

Iwago's pictures and short captions have a way of expanding one's view of penguins and their lifestyle. For example, how a penguin weathers a five-day blizzard or sits on an egg. The book also does a good job of showing how many different types of penguins there are. Most of the book has very little text but the action series of photos make up for this. The bulk of the text is contained in a series of photos with an account of his trip to Antarctica and some of the unique problems he encountered. Some of these are very interesting, such as how to dry clothes in sub- zero temps.

I would recommend the book to anyone who has an interest in penguins, Antarctica, or simply wants a good coffee table book.

Regional Conference Schedule

AZA Western Regional Conference - 11-14 March 1998 - Monterey, CA. For further information, contact Ginger Hopkins, Monterey Bay Aquarium, 886 Cannery Row, Monterey, CA 93940-1085 (408) 648-4925.

AZA Central Regional Conference - 1-4 April 1998 - Grand Rapids, MI. For further information, contact Brenda Stringer, John Ball Zoological Society, 1300 W. Fulton St., Grand Rapids, MI 49504-6100 (616) 336-4301.

AZA Eastern Regional Conference - 22-25 April 1998 - Boston, MA. For further information, contact Elizabeth Coleman, New England Aquarium, Central Wharf, Boston, MA 02110-3399 (617) 973-4925.

By Kayla Grams, Arizona-Sonora Desert Museum
and Gretchen Ziegler, Sequoia Park Zoo

ENRICHMENT CENTER FOR SMALL PRIMATES

This simple feeder was primarily designed for squirrel monkey enrichment at Lion Country Safari in West Palm Beach, FL. It could easily be used for other small primates as well.

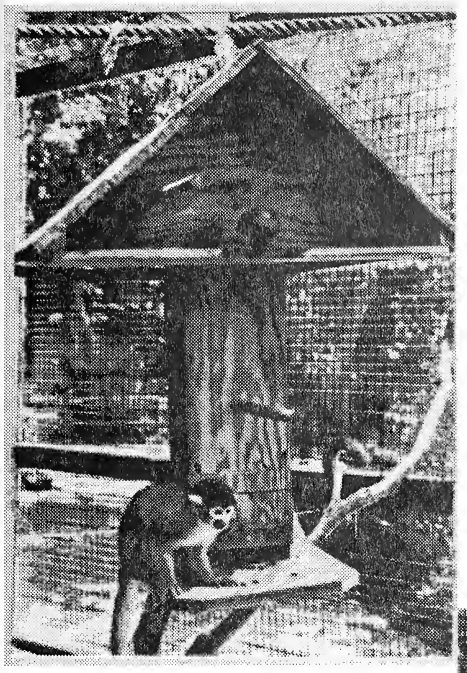
It is designed to be suspended from the ceiling of the exhibit with chain or rope. Four wooden dowels emerge from either side of the feeder, which can either be used to hang toys from or simply as perching spots. Two platforms, one in the roof and the other at the base, provide ample space for 3 or 4 squirrel monkeys to utilize the apparatus at the same time.

A new, unused, black rubber toilet plug secured to the upper platform can be used to hold any combination of yogurt, jam, honey, nuts, crickets, raisins, etc.

A lawn mower tire, suspended from the base with small gauge chain or rope, makes a great swing.

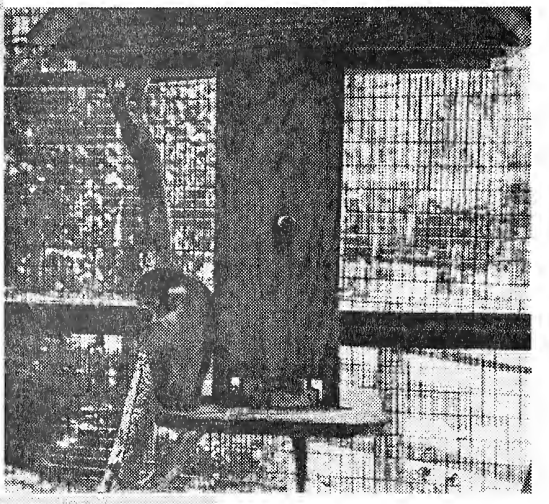
A small sliding door at the rear of the apparatus reveals a short ramp, out of reach of the squirrel monkeys, that descends to a hand-carved wooden wheel laying horizontal at the base. The wheel is divided into five sections. Food treats such as mealworms or raisins can be fed in the rear door, down the ramp, and into the wheel. Squirrel monkeys sitting at the front of the apparatus, where a portion of the wheel is exposed, must turn the wheel with their hands in order to get their treat. For those of you who are not into hand-carving wheels, I am sure that the metal distribution wheel in any standard gumball machine will serve the same purpose. Our squirrel monkeys love it! We hope that yours will too.

---designed by Paul Rambino and Tina Fridman
Lion Country Safari, West Palm Beach, FL



Squirrel Monkey retrieves treats by turning the wooden wheel located at the base of the Enrichment Center. The wheel is divided into five sections and stores such treats as mealworms and raisins.

Photo at right shows detail of wooden treat wheel. Photo below shows Squirrel Monkey utilizing rubber toilet plug in which treats are stored.



Photos provided by the authors.

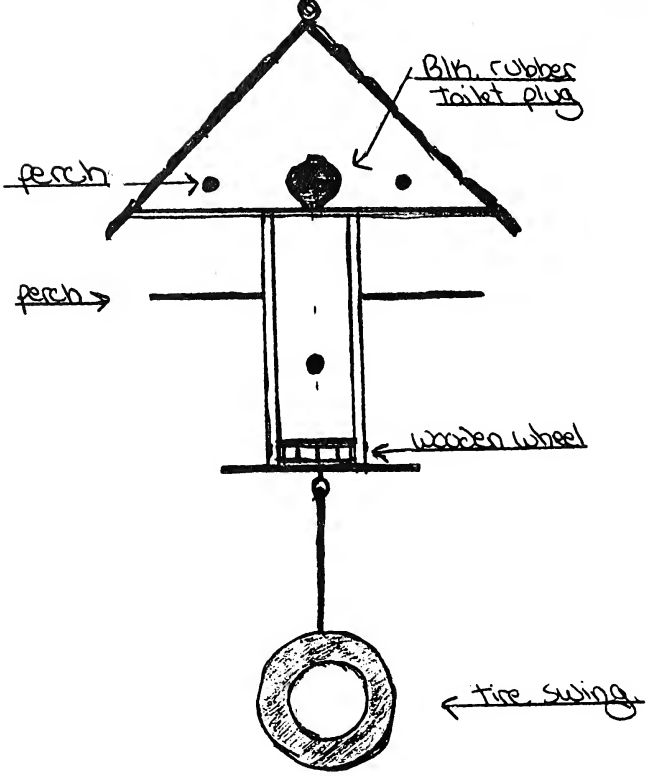


Figure 1

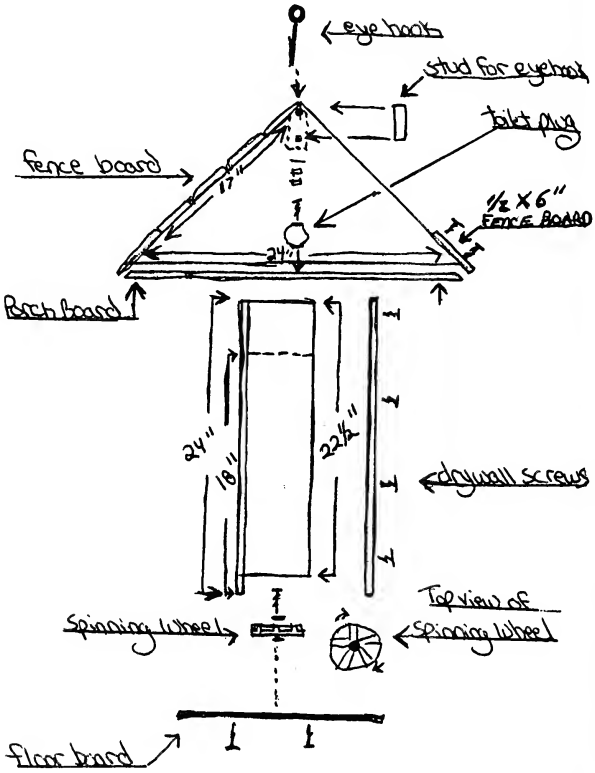


Figure 2

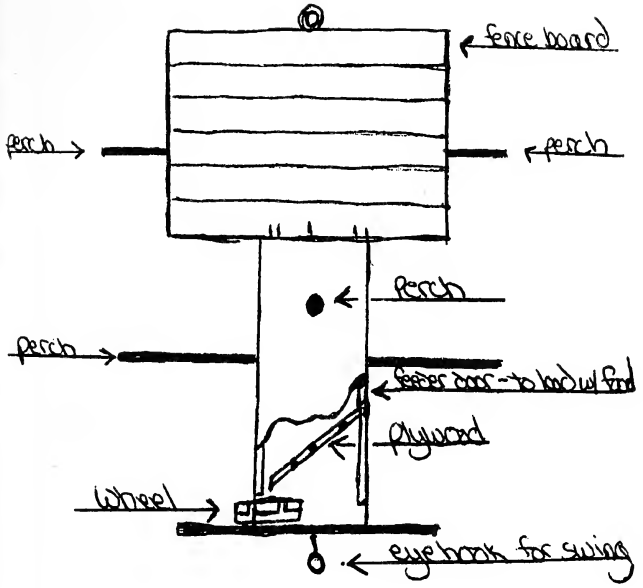
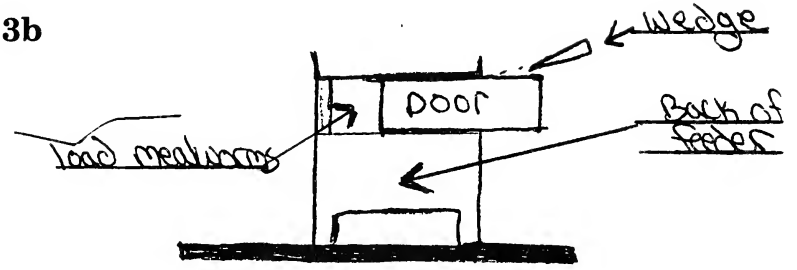


Figure 3a

Figure 3b



(Ideas appearing in this column have not necessarily been tested by the editors for safety considerations. Always think ahead and use good judgment when trying new ideas. Eds.)

Maximum Intensity: The Hand-Rearing of a Kinkajou

By
Patricia M. Hainley, Zookeeper
Ellen Trout Zoo, Lufkin, TX

INTRODUCTION

The birth of a new animal is always a time of excitement at a zoological institution. On 27 September 1996, a female kinkajou (*Potos flavus)* was born at the Ellen Trout Zoo. The decision to hand-rear was made due to many factors, including the lack of maternal care exhibited shortly after the birth, the opportunity to expose the staff to the experience of hand-rearing, and the need for an educational animal. By using the AZA 1994 Infant Diet Notebook as our main resource, a plan was developed and implemented for the care and feeding of the neonate.

NATURAL HISTORY

Kinkajous are nocturnal, arboreal mammals native to the forests of Southern Mexico, Central and South America. They belong to the order Carnivora, are classified in the family Procyonidae, and are the single species of *Potos flavus*. Adults grow to an average of nine pounds (4.09 kg) on a diet of fruits, insects, and small vertebrates. They have no particular breeding season, with gestation lasting 112-118 days. Males reach sexual maturity at 1.5 years, and females at 2.5 years. There are only two known carnivores with prehensile tails, kinkajous and binturongs (*Arctictus binturong*), with kinkajous being the only prehensive New World carnivore. In the wild they are non-territorial and mostly solitary, but can be housed in small groups in captivity. Kinkajous are commonly referred to as Honey-Bears. The most famous one being "Winnie-The-Pooh".

BACKGROUND

The population of kinkajous housed at the Ellen Trout Zoo consists of 2.2 animals. The current educational animal is a young adult male that has recently become aggressive and unpredictable. The remaining 1.2 animals are housed together on display. The older adult male is the father of the younger female, while the older female is unrelated. The younger female was determined to be pregnant on 5 May; she had a noticable weight gain and change in body shape. Unfortunately, that pregnancy ended with the cannibalization of the newborn by the display group on 13 May. She was again determined to be pregnant on 23 August and an expected due date of the first week in September was calculated. Beginning on 30 August she was separated from the display group every night to ensure the safety of the neonate.

HAND REARING

Parturition occurred during the early morning hours of 27 September 1996. By 1500 hrs. it became apparent that some form of intervention was needed, for the neonate had not been seen nursing. The decision to pull the animal from its mother was made to provide the best possible care for the inbred neonate, to maximize an opportunity for the staff to gain experience in hand-rearing, and to produce a new animal for educational presentations.

The initial physical exam supported the decision to hand-rear. Weighing only 135 gms (4.76 oz.) the neonate was below the average birth weight of 150-200 gms (5.29-7.05 oz.) (Walker 1991). Dehydration was apparent due to poor skin turgor and tone. Subcutaneous (Sub-Q) fluids were administered for rehydration, and antibiotics were administered to supplement the immune system since no nursing had been observed. The umbilicus was treated topically with Betadine®. The urogenital area was gently stimulated with a clean, damp, warm cloth after every feeding. The infant was placed in a incubator with a steady temperature of 36.67°C (98°F), with fresh clean towels for bedding and insulation. At night the infant was taken home by a keeper and kept in a small kennel with towels and a heating pad set on low.

27 September - birth at 1545 hrs. pulled from mother; 0.7 cc of 5% dextrose solution given Sub Q; 0.1cc of Amoxi-Inject® given intramuscularly (IM); lml sterilized tap water offered orally from eyedropper; at 1630 hrs. series of Sub Q injections of lactated ringers began (see Appendix II), the injections were spread out over each 24-hour period and the sites were rotated from each hip and shoulder area to prevent tissue irritation and increase fluid absorption; at 1915 hrs unflavored Pedialyte® offered every two hours from eyedropper; at 2230 hrs Esbilac® Formula offered every two hours from eyedropper, 20% body weight fed (see Appendix II), ratio of powder to water was 1:2; weight 135g (4.7 oz.)
28 September - 0.1cc Amoxi-Inject® IM; weight 139g (4.9 oz).

29 September - at 0200 hrs. infant took complete diet offered from eyedropper; activity level increased to include crawling; umbilicus fell off; weight 141g (4.97 oz.)

1 October - feedings moved to every three hours and Pedialyte® removed from diet due to excellent food intake, extreme irritability, visible constipation, constant rooting and weight loss; weight 137g (4.83 oz).

2 October - infant positively identified as female; erratic behavior and weight continued; weight 136g (4.8 oz.)

5 October - defecation without stimulation began; Sub Q injections discontinued due to continued erratic behavior; weight 140 gms. (4.94 oz.).

7 October - feedings moved to every four hours due to excellent food intake, stabilizing weight and dissipating erratic behavior; weight 160g (5.64 oz).

8 October - primary caregiver changed; infant introduced to a two-ounce Pet-

Ag® bottle; at every feeding the suckling response was stimulated with the eyedropper then replaced by the bottle; weight 170g (6 oz.).

9 October - daily body weight recorded; formula to water ratio changed to 1:3, body weight fed increased to 35%, and feedings moved to every four hours with night feedings discontinued due to inconsistent food intake, weight loss and cessation of erratic behavior; weight 168g (5.93 oz.)

10 October - infant appeared to have aspirated between 1330-1730 hrs. feedings, lungs sounded clear but gurgling sounds audible from nasal passages; weight 180g (6.35 oz.).

12 October - feedings changed to four times per day and body weight fed decreased to 20% due to inconsistent food intake and consistent weight gain; at 1530 hrs. she took complete diet offered from bottle, but gurgling sounds were again audible from nasal passages; weight 185g (6.53 oz.).

13 October - daily body temperature recorded to monitor for signs of infection; weight 192g (6.77 oz.).

14 October - body weight fed increased to 25% due to slight weight loss; infant left overnight in the incubator and staff member returned every night for the 2100 hrs. feeding; weight 190g (6.7 oz.).

16 October - eyes opened; weight 202g (7.13 oz.).

17 October - at 0800 hrs. permanently removed her from incubator, (three jaguar cubs born, pulled, and placed in the incubator), and placed in the bottom half of an apple box with a towel for bedding and a heating pad inserted underneath the box; erratic behavior displayed at feedings, frantic for nipple and continued nursing after entire diet consumed; weight 205g (7.23 oz.).

18 October - erratic behavior vanished; weight 232g (8.18 oz.).

19 October - incisor teeth became visible; stimulation of the urogenital area discontinued due to consistent elimination; formula to water ratio changed to 1:2 due to weight loss; weight 223g (7.87 oz.).

20 October - clear nasal discharge and cough noted; antibiotics administered, 0.1 cc Clavamox® PO BID x 7; weight 236g (8.32 oz.).

21 October - canine teeth became visible; weight 248g (8.75 oz.).

22 October - lactobacillus administered to replace natural bacteria in digestive tract, one capsule swabbed in mouth SID QOD x 3; weight 261g(9.21 oz.).

23 October - molar teeth and prehensile tail reflex visible; weight 266g (9.38 oz.).

24 October - 2100 hrs. feeding discontinued due to inconsistent food intake and consistent weight gain; weight 273g (9.63 oz.).

28 October - body temperature recorded bi-weekly; body weight fed reduced to 20% due to diarrhea; weight 316g (11.15 oz.).

31 October - 1/8 of a banana added to diet, banana mashed and mixed in with the daily formula; formula to water ratio changed to 1:3 due to introduction of solid foods; weight 332g (11.71 oz.).

1 November - activity level increased to include quadrupedal locomotion; weight 336g(11.85 oz.).

4 November - 1/2 Tbs. of fruit mix (see Appendix III) added to daily formula; 1/32 of a banana offered whole due to inconsistent nursing and increased chewing behavior; weight 340g (11.99 oz.).

5 November - bottle permanently removed from feedings due to refusal to nurse; banana mashed with the formula and infant allowed to feed directly from small cup; weight 341g (12.03 oz.).

6 November - fruit mix removed from the daily formula; 1/2 tsp. fruit mix and 1/16 of a banana added to each feeding; weight 354g (12.49 oz.).

9 November - each feed split into two parts; part one consisted of 1/16 of a banana and 1/2 tsp. fruit mix mixed together and offered first; part two consisted of the same fruit mixture with the formula added and offered second; weight 376g (13.26 oz.).

10 November - 1g of mashed Zu-Preem® canned primate added to both parts of each feeding to resemble adult diet (see Appendix III); activity level continued to increase and she was moved into a medium size brooder box with larger towels for bedding and a heat lamp for supplemental warmth; weight 399g (14.07 oz.).

11 November - brooder box perched with small branches; body temperature recording discontinued; weight 390g (13.76 oz.).

12 November - fruit mixture increased to 1/8 of a banana, 1 tsp. fruit mix and 2g primate per feeding all offered first, then the plain Esbilac® formula; activity level increased to include climbing and use of prehensile tail; weight 398g (14.04 oz.).

13 November - fruit mixture increased to 1/4 of a banana, 1 1/2 tsp. fruit mix, and 3g primate per feeding; Esbilac® removed and mid-day feeding discontinued due to inconsistent food intake and consistent weight gain; weight 413g (14.57 oz.).

14 November - diet offered in enclosure; weight 402g (14.18 oz.).

18 November - Esbilac® added back into diet due to excellent food intake and steady weight loss; ratio of powder to water was 1:3; 10 mls. offered per feeding after fruit mixture; weight 388g (13.69 oz.).

24 November - fruit mixture increased to 1/4 of a banana, 5g of primate; 1Tbs. fruit mix per feeding; weight 423g (14.92 oz.).

1 December - fruit mixture increased with tastes of apple and orange; all ingredients chopped fine; weight 468g (16.51 oz.)

5 December - formula to water ratio changed to 1:4 due to gradual weaning process; weight 488 gms. (17.21 oz.).

8 December - diet split into 4 parts per feeding; fruit mixture offered first, then 10 mls. (0.3 oz.) warm tap water to ensure adequate fluid intake, then 1/4 of a banana (whole), and 10 mls. formula; weight 500g (17.64 oz.).

9 December - offered 1/8 of an apple which she consumed; 1/8 of an apple added to each feeding; weight 498g (16.8 oz.).

10 December - officially named "Max"; primate increased to 10g (.35 oz.) per feeding; tap water increased to 15 mls (.5 oz.) at morning feeding while Esbilac® discontinued at afternoon feeding; weight 509g (17.95 oz.).

12 December - afternoon diet left inside enclosure overnight to stimulate normal nocturnal behavior; weight 515g (18.17 oz.).

15 December - activity level increased; excellent food intake continued; she was moved into the animal wing of the clinic with the other educational animals and placed in a holding cage with a hide box, some perching, newspaper as a substrate, and a small water dish; fruit mix removed from afternoon diet while diet increased to 1/8 of a banana, 1/8 of an apple, 1/8 of an orange and 10g (.35 oz.) primate; all fruit chopped into medium size pieces and left unpeeled to resemble adult diet; weight 558g (19.68 oz.).

17 December - afternoon diet increased to 1/4 of a banana, 1/8 of an apple, 1/4 of an orange and 20g (.71 oz.) primate; weight 548g (1.21 lbs.).

18 December - Esbilac® permanently removed from the morning feeding, weaning completed; weight 562g (1.24 lbs.).

22 December - fruit mix removed from the morning feeding, (.5 oz.) leaving only 10g (0.35 oz.) primate, 1/8 of a banana, and 15 mls. (.5 oz.) of tap water.

23 December - primate and tap water removed from morning feeding, leaving only 1/8 of a banana; weight 612g (1.35 lbs.)

24 December - morning feeding discontinued and diet increased to 1/4 of a banana, 1/4 of an apple, 1/4 of an orange, and 1/8 of a can of primate.

26 December - bi-weekly body weight recording discontinued, will be weighed on the first of the month; weight 670g (1.48 lbs.).

1 January 1997 - weight 700g (1.54 lbs.).

15 January - diet increased to 1/4 of a banana, 1/4 of an apple, 1/4 of an orange, and 1/4 of a can of primate.

2 February - weight 1100g (2.43 lbs.).

25 February - diet increased to 1/2 of a banana, 1/2 of an orange, 1/4 of an apple, 1/4 can of primate, five grapes or raisins, and three Mazuri® Old World Monkey biscuits soaked in water.

2 March - canned primate removed from diet and soaking of monkey biscuits discontinued; weight 1200 gms. (2.65 lbs.).

6 April - weight 1550g (3.42 lbs.).

7 April - keepers noticed that approx. 1/2" to 1" of tongue was missing; wound was a clean slice made by incisors and presented no discomfort or interruption of food intake.

1 May - weight 1450g (3.20 lbs.).

13 May - diet increased to 1/2 of an apple, 3/4 of a banana, 1/2 of an orange, 4 monkey biscuits, and 5 grapes or raisins.

Currently Max is used for educational programs and handled regularly by staff. She also follows the same enrichment schedule as the adults.

DISCUSSION

Hand-rearing is a time consuming and labor intensive task. However, it has been one of the most self-reinforcing and rewarding activities I have ever been involved with. As zoo keepers we inherently care for exotic species, but are seldom allowed the opportunity to physically interact with those animals. Although professional detachment is a necessity in this industry, the experience of hand-rearing can test the limits of objectivity while simultaneously renewing commitment to the profession.

ACKNOWLEDGMENTS

The author would like to thank the entire staff of the Ellen Trout Zoo for their support, enthusiasm, and flexibility. Staff members Jenifer Kimmey, Tracy Rhodes and Chris Pfefferkorn deserve special recognition for their dedication and participation in the hand-rearing process. Also, a special word of thanks to William K. Baker Jr. for his support and suggestions during the writing process.

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Hanson, Jeanne K. and Deanne Morrison. Of Kinkajous, Capybaras, Horned Beetles, Seldangs and the Oddest Most Wonderful Mammals, Insects, Birds, and Plants of Our World. New York: Perennial-Collins, 1991.

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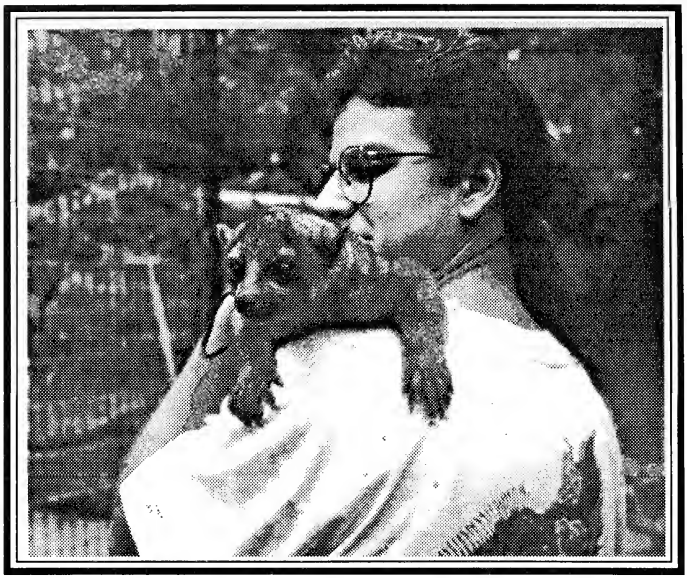
MAX the KINKAJOU



Patti Hainley, Zookeeper at the Ellen Trout Zoo, and author of this article, is shown with Max, the 0.1 kinkajou she helped hand-rear. The center photo offers a good shot of Max's prehensile tail. Kinkajous, native to Mexico, Central and South America, are commonly referred to as Honey

Photo Credit: WKB Graphics

APPENDICES

Appendix I - Development Summary

Day 3: began crawling
Day 9: began defecating without stimulation
Day 20: eyes opened
Day 23: incisor teeth became visible
Day 25: canine teeth became visible
Day 27: molar teeth became visible
Day 27: prehensile tail reflex
Day 35: began taking solids
Day 36: began walking on all four legs
Day 39: weaned off the bottle
Day 83: completely weaned onto solids

Appendix II - Formulas

A. Rehydration: 30 mls. (1 oz.) subcutaneous per 1 pound body weight every 24 hours, then divide by the number of desired injections for the amount to administer per injection.

B. Percent Body Weight Feedings: weight of infant in grams multiplied by the percent of body weight to feed gives the total amount to feed in a 24-hour period, then divide by the number of desired feedings for the amount per feeding to offer.

Appendix III - Diets

A. Fruit Mix (used during weaning):
1 can fruit cocktail in natural juices/no sugar added
1/2 of an apple (chopped)
1/2 of an orange (peeled and chopped)
1/2 of a banana (peeled and chopped)
Mix all together in blender until liquid.

B. Adult Kinkajou Diet

1. Daily:
1/2 orange
1/2 banana
1 apple
1/2 can Zu-Preem® Primate or
6 Mazuri® Old World Primate Biscuits

2. Rotational Items:
grapes
raisins
sweet potatoes
carrots
lettuce
crickets

Appendix IV - Temperature Record

All temperatures were taken rectally using either a standard glass thermometer or a digital thermometer. A small amount of K-Y Jelly® was always used for lubrication on the tip of the thermometer.

Date (1996)	Time	Temperature (°F/°C)
08 October	1600	99.2° F - 37.3° C
12 October	1530	96.8° F - 36° C
13 October	1600	96.4° F - 35.7° C
15 October	1200	97.7° F - 36.5° C
16 October	1200	98.0° F - 36.6° C
17 October	1130	99.2° F - 37.3° C
19 October	1130	97.5° F - 36.4° C
20 October	0800	95.7° F - 35.4° C
20 October	1100	98.6° F - 37.0° C
20 October	1700	98.0° F - 36.7° C
21 October	0800	96.1° F - 35.6° C
22 October	0800	95.6° F - 35.3° C
23 October	0800	less than 96.0° F
23 October	1600	97.4° F - 36.3° C
24 October	0800	96.1° F - 35.6° C
25 October	0800	98.3° F - 36.8° C
26 October	0800	96.4° F - 35.7° C
27 October	0800	98.8° F - 37.1° C
30 October	0800	98.8° F - 37.1° C
03 November	0800	95.3° F - 35.2° C
07 November	0800	95.2° F - 35.1° C
11 November	0800	94.5° F - 34.7° C

Appendix V - Product Sources

Esbilac®
Bordon Chemical Co., Bordon Inc.,
Norfolk, VA 23501

Mazuri® - Purina Mills
Specialty Business Group
P. O. Box 66812
St. Louis, MO 63166-6812
(314) 768-4592

Pedialyte®
Ross Laboratories
Division of Abbott Laboratories, USA
P.O. Box 1317
Columbus, OH 43216

Pet-Ag®, Inc.
261 Keyes Ave.
Hampshire, IL 60140
(800) 323-0877

Zu-Preem® Premium Nutritional Products Inc.
P.O. Box 2094
Mission, KS 66202
(800) 345-4767

Chapter News Notes

Assiniboine Park Zoo Keepers Association

The Assiniboine Park Zoo Keepers Association. The Assiniboine Executive Officers for 1997. Serving are:

President.....Mark de Denus
Vice-President .....Janice Martin
Secretary.....Val Norquay
Treasurer.....John Toothill

The Chapter is celebrating its 15th year as a chartered Chapter of AAZK, Inc. Assiniboine was the first AAZK Chapter chartered in Canada.

We participated in Bowling for Rhinos with our own "Rummaging for Rhinos" event. We raised approximately $2200.00 during the day (conversion to US funds makes that about $1600.00).

Our event took place on 31 May in the Zoo's South Parking Lot. We had the support of the Zoo (location and storage), Parks and Recreation Department(barriers, tables, garbage pickup), as well as, great support from staff and volunteers of the City.

We were able to get lots of donations for the sale from staff members and from the community at large. We also sold plants that were donated from the Assiniboine Park Conservatory. In addition to the sale, we had a silent auction that ran at the same time.

The Assiniboine Park Zoo is hosting the Canadian Association of Zoological Parks and Aquariums (CAZPA) Conference in October. We look forward to participating in programs or with support.

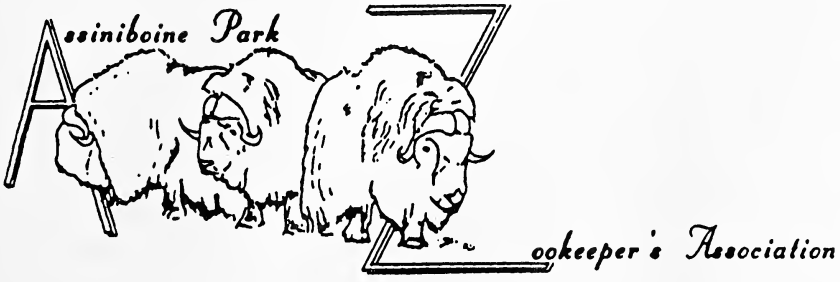
Several Chapter members are also participating, with other Canadian keepers and managers, in writing husbandry standards for the CAZPA Minimum Husbandry Standards Manual.

—*Mark de Denus, President*

San Diego Zoo AAZK Chapter

The officers for the San Diego Chapter for 1997 are:

President.....Trisha Olow
Vice President.....Allison Bureau
Treasurer.....Nicki Boyd
Secretary.....Joann Haddad
Chapter Liaison.....Janet Spevak
Supporting Board Members.....
Elizabeth O'Hara and Donna Kent



We are looking forward to the new ideas and the general excitement we feel while working as a team to encourage membership and keeper interaction. This year we raised almost $6,000.00 during our Bowling for Rhinos event. We want to thank everyone involved and hope to elicit more participation in the coming year.

—Janet Spevak, Chapter Liaison

Wildlife Safari Chapter Seeks Auction Donations

The Wildlife Safari Chapter in Winston, OR is soliciting other AAZK Chapters for donations for a silent auction fundraiser to be held just prior to Christmas. A portion of the proceeds will help toward the purchase of a Rainforest Parking Meter from the Center for Ecosystem Survival, or toward support of other conservation-minded organizations. Any and all items accepted: T-shirts, sweatshirts, jewelry, pins, patches, zoological paraphernalia, or any other merchandise. Please enclose an approximate value of your donation. We appreciate any support we might receive. Questions, comments, or ideas? Contact Scott Bentall at (541) 957-8276 (h); Judy Harkleroad at (541) 496-3349 (h); or Gena Bentall (541) 679-2988 (h). All three may be reached

AMERICAN ASSOCIATION OF ZOO KEEPERS
SAN DIEGO CHAPTER

ATTENTION ALL CHAPTERS

All AAZK Chapters are requested to send a copy of their current logo. We would like to consistently use logos in the Chapter News section and wish to make sure we are not utilizing outdated logos. Please send a clean, crisp black and white rendition of your Chapter logo. Send it **unfolded** with cardboard stiffener in the envelope to protect it against damage. We will be using Chapter logos via an image scanner, so they need to be unbent, clear and have good contrast. Also please include the year the logo was adopted by your Chapter and who did the logo design. Also, include if there is any particular significance to the animals depicted in your logo in relation to your zoo or geographic area. We will be working toward putting together a new Chapter Logo Registry in 1998 which will be distributed to all Chapters. Make sure your current logo is included! Thank you in advance for your assistance with this project.

--The Editor

New Monkey Found

Michael Astor, writing for the Associated Press, reports that a Dutch scientist has discovered a new species of monkey in Brazil. The new species, tentatively called the black-headed sagui dwarf, is the second smallest monkey species known. It is four inches tall and lives in an area smaller than Rhode island between two Amazon River tributaries. The species discoverer, Marc Van Roosmalen, noted: "I expect to describe between 10-13 new species in the next few years, and this was in an area thought not to be very important." *GREEANlines #446 8/18/97*

Institutions wishing to advertise employment opportunities are asked to send pertinent data by the ***10th of each month*** *to: Opportunity Knocks/AKF, 635 S. W. Gage Blvd., Topeka, KS 66606-2066. Please include closing date for positions available and when setting these dates keep in mind that because of bulk-mail, most readers do not receive the AKF until the middle of the month or later. There is no charge for this service and fax listings of positions which become available close to deadline are accepted. Our fax is (785) 273-1980.*

REPTILE KEEPER...Zoological Society of San Diego is seeking a Keeper to work in the Reptiles Department. This position will require strong knowledge and experience of husbandry and propagation techniques necessary for a diverse group of reptiles and amphibians. Experience with dangerous and venomous species desirable. Skills needed to perform maintenance of exhibit/facilities, data collection and record keeping. Public speaking skills required for educational presentations. A degree in biology, zoology, and/or related experience is desirable. Submit a letter of intent, resumé and the names of three references to: San Diego Zoo/Human Resources Office/Otto Center (ATTN:RK#164007), P. O. Box 551, San Diego, CA 92112-0511. **Deadline to apply is 24 October 1997**

CURATOR OF BIRDS...Toledo Zoological Society seeks individual with Bachelor's degree in animal sciences and a minimum two (2)years supervisory/curatorial experience in the management of a zoological institution bird collection. Responsibilities include acquisition, maintenance and care of a major bird collection, and overseeing the completion of a $5.5 million renovation project currently underway in the birdhouse. Must have proven management skills and excellent written/oral communication skills. Starting salary range is $38,090.00 to $43,000.00 per year, depending on qualifications. EOE. Submit resumés **by 31 October 1997** to: Nancy Foley, Director of Human Resources, The Toledo Zoo, P. O. Box 4010, Toledo, OH 43609.

AVIARY MANAGER...immediate opening at Red Tail Express, Inc., Dunnellon, FL. Full-time live on premises position includes apartment and health insurance. Must have a strong reference. Fax resumé to: (352-4333).

KEEPER...Permanent, full-time position at Scovill Zoo, Decataur, IL. Requires B.S. in animal-related field. Responsibilities include daily care of animals in a 15-acre zoo displaying a diverse collection of mammals, birds, herps and fish. Salary $7.22/hour, excellent benefits. To apply submit resumé and references to Mike Borders, Director, Scovill Zoo, 71 S. Country Club Rd., Decatur, IL 62521-4470, (217) 421-7435 **by 1 November 1997**.

The following two (2) positions are being advertised by the Tracey Aviary. Send required application elements per each ad to: Marlayn Shreeve, Executive Director, Tracey Aviary, 589 East 1300 South, Salt Lake City, UT 84105.

LEAD BIRD TRAINER...requires two-year degree in a related field, three years training experience with a variety of bird species, experience in the physical/veterinary care of birds, and proven ability to train/supervise staff. Responsible for overall creation/production of a professional, educational, and entertaining bird show. Will perform summer shows at Aviary and winter outreach to schools and other venues. Salary $20,000.00 - $25,000.00 plus benefits. Send letter, resumé, video showcasing experience if available, and three (3) references to address above.

EDUCATION CURATOR...responsible for the development and implementation of all education programs. Assists in the production of promotional material including newsletters, visitor information, and educational exhibits. Must be able to supervise staff, communicate effectively and be team oriented. Bachelor's degree (Masters preferred) in ornithology, biology, education or a closely related field and four years experience in public relations and education (zoo, aviary or natural history setting preferred) including one year in supervisory position. Bird handling experience helpful. Excellent

communication and writing skills a must. Starting salary in the low 30's. Applications will be reviewed January 1998. Send letter, resumé and three (3) references to address above.

The following two (2) positions are available at Caribbean Gardens, a 52-acre botanical and zoological preserve in Naples, FL.

ANIMAL KEEPER/MAMMALS...seeking individual with a minimum of one year's paid experience in the zoological setting. Responsible for daily husbandry including diet prep and delivery, cleaning, record keeping and enrichment. Successful candidate shall have public speaking experience, ability to lift 50 lbs. items, and basic canoeing skills for primate island feeding. Salary based on experience. Profit-sharing plan available. Mail, fax or e-mail resumé **by 1 November 1997** to: David Tetzlaff, General Curator, Caribbean Gardens, 1590 Goodlette Rd., Naples, FL 34102; Fax (941) 262-6866; e-mail - CARGAR@NAPLESNET.COM

ANIMAL SHOW PRESENTER...position available in our new 'Safari Canyon' staging area. This presentation combines live animals, interactive videos and graphics in a naturalistic setting. Applicants will require excellent audience communication skills, the ability to handle small mammals and reptiles, working in a team atmosphere, and animal husbandry skills. Any experience with felids a plus. Send resumé, references and video of the applicant in an animal show format to David Tetzlaff, General Curator at the address above.

ANIMAL KEEPER...City of Los Angeles. Cares for exotic animals at the Los Angeles Zoo; observes and reports on animal behavior and condition; answers questions from the general public. Requires one (1) year full-time paid experience in care and maintenance of exotic animals at a facility similar to the LA Zoo OR completion of the Animal Keeper Training program conducted by the Los Angeles Zoo (or equivalent program at an accredited school or college). Request application materials from: City of Los Angeles Personnel Dept., Applicant Services Division, Room 100, 700 E. Temple St.., Los Angeles, CA 90012. Information by phone from (213) 847-9780; or on the Internet at: http://www.ci.la.ca.us./dept/PER/index.htm. Filing may close at any time after sufficient applications are received. **Interviews anticipated in January 1998**.

CHIMPANZEE CAREGIVER...one full-time position open. Requires two (2) years of college-level course work, two years experience in the care of exotic animals; OR an equivalent combination of experience which provides the required knowledge, skills, and ability. Primate experience a plus. Assist in the responsibility of caring for approximately 80 chimpanzees (*Pan troglodytes*) in a breeding colony. Must be willing to make at least a two year commitment. Excellent benefits. EOE. Applicant must have a negative TB skin test, negative hepatitis B surface antigen test, and evidence of a measles booster or natural disease prior to employment. Send letter of interest (with requested salary), resumé and three letters of reference to: Jo Fritz, Director, Primate Foundation of Arizona, P. O. Box 20027, Mesa, AZ 85277-0027. Position open until filled.

ANIMAL KEEPER...The Lee Richardson Zoo is seeking resumés from highly motivated, team-oriented individuals. The position requires a high school diploma and zoo keeping experience. Responsibilities would include daily work with a variety of classes of animals. Salary range from $6.69-$9.29 per hour depending upon education and experience, plus an excellent benefits package. Send resumé to: Jeff Bullock, Lee Richardson, P. O. Box 499, Garden City, KS 67846. **The position will remain open until filled.**

AAZK Membership Application

check here if renewal [ ]

Name _____

Address _____

City _____ **State/Province** _____ **Zip** _____

U.S. Members

☐ **$35.00 Professional**
Full-time Keepers

☐ **$30.00 Affiliate**
Other staff & volunteers

☐ **$30.00 Associate**
Those not connected with an animal facility

☐ **$60.00 or up** - *Individuals*
Contributing/U.S.

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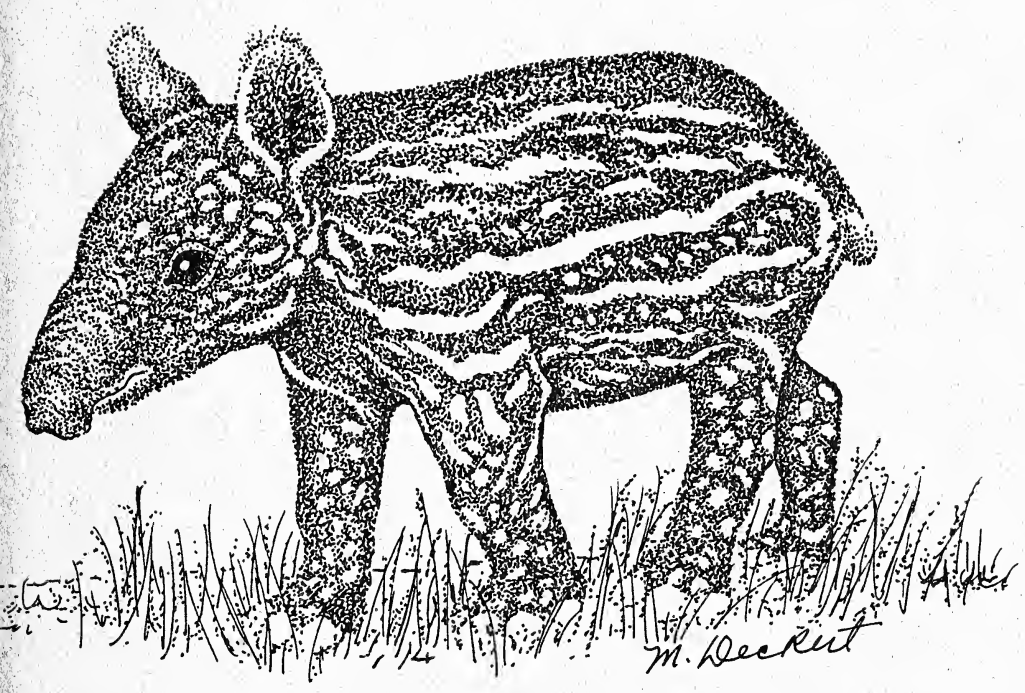

The Journal of the American
Association of Zoo Keepers, Inc.
NOVEMBER 1997

ANIMAL KEEPERS' FORUM, 635 S.W. Gage Blvd., Topeka, KS 66606-2066
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NOVEMBER 1997
Vol. 24, No. 11

Managing Editor: Susan D. Chan • **Associate Editors/Enrichment Options Coordinators:** Kayla Grams, Arizona-Sonora Desert Museum & Gretchen Ziegler, Sequoia Park Zoo • **Book Review Coordinator:** Andrea Bernee, Chaffee Zoological Garden • **Legislative Outlook Column Coordinator:** Georgann B. Johnston, Sacramento, CA. • **ABC's Column Coordinator:** Diana Guerrero, San Diego, CA • **Reactions Column Coordinator:** William K. Baker, Jr., Lufkin, TX

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About the Cover.....

This month's cover features the Baird's Tapir (Tapirus bairdii) drawn by Mary Deckert, a Docent at the Los Angeles Zoo. Thai legend tells how, when the world was made, God put together the tapir with parts borrowed from other animals. This would explain why the tapir has the shape of a pig, the feet of a rhinoceros, hoofs like those of cattle, and a snout like a small elephant trunk. There are four species of tapir: Baird's , Brazilian, Mountain, and Asiatic Malayan. These herbivores are shy animals that usually stay hidden during the day, coming out at night to feed on leaves, grasses and roots. They like to bathe and are never far from water where they may hide when threatened. They live in family groups and the young have longitudinal spots and streaks on their coats which disappear as the animal matures. Thanks, Mary!

Information for Contributors

Animal Keepers' Forum publishes original papers and news items of interest to the animal keeping profession. Non-members are welcome to submit articles for consideration. Articles should be typed or hand-printed and double-spaced. Authors are encouraged to submit their manuscripts on a disk as well as in hard copy form. Acceptable formats include: for Macintosh users - Microsoft Word or Works; IBM users - Word for Windows, WordPerfect or Wordstar. All illustrations, graphs, charts and tables should be clearly marked, in final form and should fit in a page size **no greater than** 5.5" x 8.5" (14cm x 22cm). Literature used should be cited in the text (Brown, 1986) and alphabetically in the final bibliography. Avoid footnotes. Include scientific name (as per ISIS) the first time an animal name is used. Thereafter use common name. Use metric system for weights and measurements (standard equivalents may be noted in parenthesis). Use the continental dating system (day-month-year). Times should be listed as per the 24-hour clock (0800, 1630 hrs. etc.). Glossy finish black and white photos **only are accepted**. Color slides should be converted to black and white prints (minimum size 3" x 5" [8cm x 14cm]) before submission. Clearly marked captions should accompany photos. Please list photo credit on back of photo.

Articles sent to *Animal Keepers' Forum* will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for *AKF*. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed, appropriately-sized envelope. Telephone and FAX contributions of late-breaking news or last-minute insertions are accepted as space allows. However, long articles must be sent by U.S. mail. Phone 1-800-242-4519 (US); 1-800-468-1966 (Canada); FAX (785) 273-1980.

Deadline for each regular issue is the 10th of the preceding month.
Dedicated issues may have separate deadline dates
and will be noted by the editor.

Articles printed do not necessarily reflect the opinions of the *AKF* staff or the American Association of Zoo Keepers, Inc. Publication does not indicate endorsement by the Association.

Scoops & Scuttlebutt

Houston's History...but what a Conference!

Thanks go out to all of the members of the Greater Houston AAZK Chapter, the staff and volunteers of the Houston Zoological Gardens, and the Houston Zoo Friends for making the 24th National AAZK Conference such a great event. Approximately 330 delegates representing117 institutuions from 36 States and four Canadian Provinces as well as six delegates from overseas descended on Houston the week of October 5-9. The Conference included great paper sessions and workshops, onsite visits to the Houston Zoo and Moody Gardens, two highly successful auctions, beachfront Zoolympics, pre- and post-conference trips, as well as a variety of social activities offering both great food and music!

Hosting a National Conference is a challenging task, requiring planning, attention to details, cooperation and a lot of hard work. But the opportunity to bring together zoo keepers from across the country and around the world to one spot to spend an intense week learning from each other and exchanging information vital to the zookeeping profession may just well make it all worthwhile! Special thanks go to Co-Chairs Ric Urban and Christina Smith as well as Program Chairs Stan Mays and Terry Fisher. Greg Whittaker and the staff at Moody Gardens in Galveston also deserve special recognition for providing a wonderful time at their facility. While the Texas weather and the remanants of Hurricane Pauline conspired to keep a good part of the week wet and rainy, delegates plunged ahead through day after day of dynamic Conference activities. It takes a lot to slow down an AAZK member.

We will all look forward to gathering in Indianapolis, IN from Sept. 27-30 for the 1998 Conference; in Portland, OR from Sept. 12-17 for the 1999 Conference; and in Columbus, OH (dates to be announced) for the year 2000 National AAZK Conference. Where will we be in 2001? Stay tuned!

Chapters Acknowledged for Continuing Support

The Board of Directors and the staff of the American Association of Zoo Keepers, Inc. would like to sincerely thank the Philadelphia Chapter for their donation of $500.00 designated for AAZK's International Outreach projects; and the Columbus Chapter of AAZK for their generous donation of $550.00 raised during an April fundraiser and designated for the general operating fund of the Association. It is this kind of support which allows the Association to move forward with its many programs and projects in the fields of conservation, continuing education and the promotion of the highest quality standards for the zookeeping profession.

Chapters are indeed the backbone of this Association and it is through their support that AAZK, Inc. continues to grow and mature into an international professional association for all those involved in captive animal husbandry. We salute the Philadelphia and Columbus Chapters for their commitment to AAZK's future.

Zoo Infant Development Project/Passerines Update

The ZIDP/Passerines Survey was mailed out in mid-September to over 85 institutions. Each facility has been asked to complete the survey on passerines for

which ISIS records indicate they have had successful breedings. If you have not received the survey or have any questions, please contact Jennifer Hackshaw at (813) 935-8552, ext. 221.

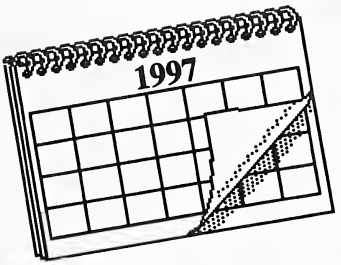
Correction of Note

Under the "Enrichment Committee Seeks Workshop Topics" published in the September 1997 Scoops and Scuttlebutt, Lee Houts was noted as being at the Sacramento Zoo. Lee Houts is now at the Folsom City Zoo, 50 Natoma St., Folsom, CA 95630; phone (916) 351-3527 and fax (916) 35-7227. Lee has recently succeeded Dianna Frisch, now retired from the Columbus Zoo, as Chair of the AAZK Enrichment Committee.

A Few Items from the AKF and AO Staff

1. Please check out the 1997 Conference Proceedings Order Form found elsewhere in this issue of *AKF*. Orders are now being taken for early 1998 delivery.
2. Chapter are reminded that Recharter Packets will go out the first week in January and are due back at Administrative Offices **by 1 March 1998**. (See deails under Chapter News)
3. After much discussion and deb ate, the *AKF* editorial staff has decided not to revive the Births & Hatching column in this publication. It was decided that much of this information is available elsewhere; a really workable format was never found for this type of information; and we felt the space could be better utilized for husbandry or enrichment materials. We will be pleased to highlight a significant birth or hatching at your facility, but we ask that you submit such with a photo and a brief description of the event, its significance to your facility, the zoo community, etc.
4. In reply to the comments and calls we receive concerning the time of the month when you receive your *Animal Keepers' Forum*; the *AKF* is usually mailed between the 26th and 28th of each month and it is sent nonprofit, bulk rate. Depending on how busy the sub-station post offices are with first class mail, your *AKF* could end up being held for several days at each sub-station through which it passes on its way from Topeka to you. Once the *AKF* leaves the mailing service, we have no control over how fast it moves through the mail. The majority of members usually receive their copy by the second week of the month, but we know that there are members who do not receive their issue until nearly the end of the month, and sometimes several days or a week later than other members at the same zoo. We cannot explain this anomaly, but we do sympathize with the frustration of late delivery—especially for those interested in closing deadlines on job listings. If you have consistently late delivery, please contact AO for alternative mailing options.
5. PLEASE send in your change of address as soon as possible! It costs the Association 50 cents for each *AKF* returned because of an unreported address change. Since *AKF* is sent bulk-rate it is **not** automatically forwarded to your new address and is, in fact, often discarded by the P. O. Keeping us up-to-date on your correct and current address will help alleviate this problem. Just call on the 800 numbers listed in the journal to advise us of any changes. Issues missed because of failure to notify AO of an address change **will not** be sent gratis, but may be purchased for $3.00 each. Your cooperation is most appreciated.

Coming Events



18th Annual Elephant Managers Association Workshop - November 1-4, 1997 in Fort Worth, TX. For further information contact: Steve Clarke, Fort Worth Zoo, 1989 Colonial Parkway, Fort Worth, TX 76110; phone (817) 871-7415; Fax (817) 871-7012.

ChimpanZoo Annual Conference - November 15-19, 1997 in Little Rock, AR. For further information contact: Mark Hartmann, Ph.D., Dept. of Sociology/Anthropology, University of Arkansas, 2801 So. University Ave., Little Rock, AR 72204; phone (501) 569-3176; or e-mail MAHARTMANN@UALA.EDU

The Second Biennial Zoos Committing to Conservation Conference - December 11-14, 1997 in Tampa, FL. Hosted by Busch Gardens. Topics to include program development, biodiversity issues, case reports, and the creation of a database from existing *in situ* programs. For further information contact: Beth Grayson at (813) 987-5548.

AZA Schools - February 2-7, 1998 at Oglebay Park,Wheeling,WV. Courses include: Professional Management Development for Zoo and Aquarium Personnel, Applied Zoo and Aquarium Biology, Conservation Education Training, Principles of Elephant Management, Studbook I, Population Management, and Institutional Records Keeping. For further information contact; AZA Office of Membership Services, Oglebay Park, Wheeling, WV 26003, (304) 2160.

Sixth Annual Conference of the International Association of Avian Trainers and Educators - February 6-9, 1998 in Minneapolis, MN. Hosted by the Minnesota Zoological Gardens. For information contact: Joanna Eckles, Bird Show Zoologist, Minnesota Zoological Gardens, 13000 Zoo Blvd., Apple Valley, MN 55124. Phone: (612) 431-9356; or fax (612) 431-9300.

18th Biennial Pronghorn Workshop - March 23-27, 1998. Hosted by the Arizona Game and Fish Dept., in Prescott, AZ. For information contact: 18th Biennial Pronghorn Antelope Workshop, Richard A. Ockenfels, Chair, P. O. Box 41716, Phoenix, AZ 85080-1716; Phone: (602) 789-3379; Fax: (602) 789-3918; e-mail - rockcenfels@gf.state.az.us

1998 AZA Regional Conference Schedule

AZA Western Regional Conference - 11-14 March 1998 - Monterey, CA. For further information, contact Ginger Hopkins, Monterey Bay Aquarium, 886 Cannery Row, Monterey, CA 93940-1085 (408) 648-4925.

AZA Central Regional Conference - 1-4 April 1998 - Grand Rapids, MI. For further information, contact Brenda Stringer, John Ball Zoological Society, 1300 W. Fulton St., Grand Rapids, MI 49504-6100 (616) 336-4301.

AZA Eastern Regional Conference - 22-25 April 1998 - Boston, MA. For further information, contact Elizabeth Coleman, New England Aquarium, Central Wharf, Boston, MA 02110-3399 (617) 973-4925.

New Professional Members

Tracy Gartland, **Seneca Park Zoo (NY);** Tony Schauer, **Conneaut Lake Park (PA);** Patricia Walsh, **Baltimore Zoo (MD)**; Kelts C. Gordon, **Santa Fe Teaching Zoo (FL)**; Ralph P. Williams, **Caribbean Gardens (FL)**; Lanni Hall, **Birmingham Zoo (AL)**; Alex Sansone, Perry Sellars, and Kim Wolfe, **Gatlinburg Municipal Black Bear Habitat (TN)**; Christy A. Cliett, **Jackson Zoological Park (MS)**; Stacy Lester, Michelle Wise, and David A. Hodge, **Louisville Zoological Gardens (KY)**; Alicia C. Giesecke, **Columbus Zoo (OH)**; Jennifer S. Roesler, **Toledo Zoo (OH)**; Dana N. Moris, **Columbian Park Zoo (IN)**; Brenda Gunder, **Rolling Hills Refuge (KS)**; Jack Hetherington, **Omaha's Henry Doorly Zoo (NE)**; Lindy Wickliffe, **Louisiana Purchase Zoo (LA)**; Betty L. Thomas, **Tulsa Zoo (OK)**; Jim McCauley, Maria Browning, Alina Stallman, Stephanie Junker and Dimas Dominguez, **San Antonio Zoo (TX)**; Don Dasinger, **Denver Zoological Gardens (CO)**; Nicole Beougher, **Tropicana Wildlife Department (NV)**; Robert Cisneros, **San Diego Zoo (CA)**; David Gribes, **Moonridge Zoo (CA)**; Kristin Evans, **Sacramento Zoo (CA)**; Stuart Camps, **Fear-No-More Zoo (CA)**.

New Institutional Members

Tracy Aviary, Salt Lake City, UT

The Emperor Valley Zoo, Trinidad, West Indies (Ken Caesar)

Drusillas Park Ltd., Great Britain

Renewing Institutional Members

Salisbury Zoo Commission, Inc., Salisbury, MD

Santa Fe Community College Teaching Zoo, Gainesville, FL (Jack Brown, Director)

The Larson Company, Tucson, AZ (Don Kohl, Vice President)

Chaffee Zoological Gardens, Fresno,CA (Ralph Waterhouse, Director)

Renewing Contributing Members

Bruce R. Thomas, Takoma Park, MD

William H. Disher, Volunteer, San Diego Zoo &Wild Animal Park San Diego, CA

Richard Block, Vice President of Scientific and Program Development Indianapolis Zoo, Indianapolis, IN

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Susan Chan - Managing Editor AKF
Orca - Office Cat

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ZIDP/Reptiles/Amphibians UPDATE

Co-Coordinators for the Zoo Infant Development Project for Reptiles and Amphibians, Jeanne Walsh (Newark Museum Mini-Zoo) and Linelle Smith (Denver Zoo), would like to personally thank José Ruiz for all of his help on this project — he has been a tremendous help to us! Also, if anyone is interested in aiding us in gathering information, please feel free to contact us at the addresses listed at the end of this article.

We wish to acknowledge these recently returned species surveys:

Donald Heimall, private breeder, - Florida striped mud turtle (*K. bauri*)

Teryl Nolan, Lowry Park Zoo, - yellow-footed tortoise (*G. denticulate*); spotted turtle (*C. guttata*); prehensile-tail skink (*C. zebrata*); and eastern diamond-back rattlesnake (*C. adamanteus*).

Andy Snider, Detroit Zoo - Solomon Island's leaf frog (*C. guentheri*)

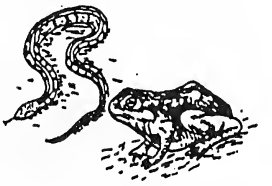
New Jersey State Aquarium (passed on to us from Sue Kenney, Omaha's Henry Doorly Zoo) - green frog (*R. clamitans melanota*); musk turtle (*S. odoratus*); spotted turtle (*C. guttata*); northern diamondback terrapin (*M. terrapin*).

Randy Smith, Birmingham Zoo - beaded lizard (*H. h. horridum*)

Diane Callaway, Omaha's Henry Doorly Zoo - Homes hingeback tortoise (*K. homeana*)

John Whitehead, Knoxville Zoological Gardens - Phillipine pit viper (*T. mcgregori)*

Bob Johnson, Metro Toronto Zoo - Surinam toad (*Pipa pipa*); Puerto Rican crested toad (*P. lemur*); New Guinea tree frog (*L. infrafrenata*); White's tree frog (*L. caernulea*); and arrow poison frog (*D. tinctorius, D. leucornelas, D. auratus*).



Thank you from AAZK for your greatly needed contributions everyone! Please keep filling out those data sheets and sending them in to us—your information is invaluable. If you have questions or need additional forms, please contact us.

Jeanne Walsh
Newark Museum Mini-Zoo
49 Washington Street, P. O. Box 540
Newark, NJ 07101-0540

Linelle Smith
Denver Zoological Gardens
2300 Steele Street
Denver, CO 80205-4899

1997 Conference Proceedings Order Information

If you are interested in obtaining a copy of the Proceedings containing the papers presented at the 24th National AAZK Conference held in Houston, TX, you will need to fill out and return the form on the next page no later than **31 January 1998**. All orders **must** be prepaid in U.S. Funds ONLY. Allow 4-6 weeks following deadline for receipt of publication. Prices are as follows:

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Postage for U. S. orders is included. Canadian and overseas orders should add $5.00 for Air Mail postage to Canada and Surface postage elsewhere. Overseas orders wishing Air Mail service should add $10.00. Make checks payable to AAZK, Inc.

Note: Individuals who presented papers at the conference **and** submitted a manuscript in time for inclusion in these Proceedings will receive a gratis copy. If a manuscript was **not** submitted, a gratis copy will not be sent, and those individuals will need to order a copy if they want one.

Cost of the Proceedings was **NOT** part of the Conference Registration Fee & delegates wishing a copy will need to order one.

The following papers are among those included in the Proceedings: A Cooperative Recovery Program for a Vanishing Species ~ How Old Was That Pregnant Elephant? ~ Management of a Rhinoceros Medical Problem Without Behavioral Conditioning ~ Coral Propagation and Exhibition at the Pittsburgh Aqua Zoo ~ Environmental Enrichment for Captive Raptors in Training ~ Penguin Water Interaction for Advanced Careers Camp at Sea World of Texas ~ Project Puffin - Seabird Conservation is an Attitude ~ Reintroduction of an Infant Southern Black Rhinoceros 68 Hours Past the Current Standard Limit ~ Bowling for Rhinos/A Visit to Lewa Downs ~ Okapi Husbandry at White Oaks Conservation Center ~ Bowling for Rhinos Conservation Areas ~ First Class Fostering: Bald Eagle Conservation at the Salisbury Zoological Park ~ Successful Reproduction in a Small Flock of Chilean Flamingos ~ The Weaning, Socialization and Reproductive History of Caribbean Flamingos at the San Antonio Zoo ~ Displacement Aggression in Captive Long-tailed Green Magpies ~ Introduction of Female Francois Langur to an Existing Group ~ Kansas City Zoo Semen Collection in the African Elephant ~ Routine Milk Collection from Crate Conditioned Bongo at the Denver Zoo ~ Protected Contact: Beyond Elephants ~ No More Knockdowns: Indian Rhino Footcare Without Anesthetic ~ Native Wildlife Veterinary Care at the North Carolina Zoological Park ~ Physical Therapy with a Female African Lion ~ Injection Training of a Female Lowland Gorilla ~ Introduction to the World Wide Web ~ Synthesis of Zoos and Aquariums ~ Whose Beach Is It? ~ Ecological Habitats on a Budget ~ Red Panda Husbandry Training ~ Early Socialization of Hand-Reared Neonates at San Diego Zoo ~ Our Time is Running Out to "Save the Colobus" ~ Benefits of Urine Collection in Determining Cyclic Behavior and Reproductive Success in Owl Faced Monkeys.

These are the papers which had been submitted as of this month's press time. We also plan to include any other papers, workshop summaries and poster session abstracts that become available to us by our publication deadline.

Feel free to photocopy the form on the next page to place your order. Phone orders may be placed at 1-800-242-4519 (U. S.) or 1-800-468-1966 (Canada) when using either a Mastercard or VISA credit card.

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Proceedings are only available by sending in your order form now. A very limited number of copies beyond prepaid orders will be printed. Once these are sold, complete sets of proceedings will no longer be available. After this, copies of individual papers will be available for $3.00 each. So **ORDER NOW !**

ABCs . . . .

Animal Behavior Concerns & Solutions

A Question and Answer Forum for the Zoo Professional

By Diana Guerrero, Independent Behavior Consultant,
Ark Animals of California, San Diego, CA

Gorilla (*Gorilla g. gorilla*) Evaluation, Zoo

QUESTION

We would like to integrate our male silverbacks (Gorilla gorilla gorilla) into a bachelor grouping. What kind of input do you have regarding this?

BACKGROUND

This particular type of strategy had been discussed and attempted in both the United States and in Europe. The Species Survival Plan® (SSP) would best dictate some of the concerns and issues on this matter. A chapter was planned for inclusion in the *Gorilla Husbandry Manual* on this topic as well; it should be available about the time this column appears.

As of the time this column was written, there are several bachelor groups in captivity across the USA. These groups include: Birmingham, St. Louis, St. Paul, Zoo Atlanta, Cleveland, Memphis and Knoxville. Contacting these resources and conducting a search for literature will assist you further in preparation to do this work.

In Europe/England at Howletts and Cologne, there are males housed in this type of grouping. Cologne's animals were scheduled to move into the UK last year, but I am not certain of the reasons behind this.

The Species Survival Plan® (SSP) is interested in looking toward creating future groups of this sort to assist with management and is investigating the processes, and the successes and failures of attempts to date. This is an ideal situation since the genetic base is a valuable component in captive collections.

OTHER NOTES

The specifics of this situation involves three male gorillas (*Gorilla g. gorilla*). Ages of all animals in this group are over 13 years old and they are classified as silverbacks. The cursory animal history shows a hand-reared individual with little socialization (hand-reared in the nursery for two years), history of aggression to female conspecifics, and high aggression of one animal in his prime (teens) to another male in the group (not quite twice his age). Other relevant information is that these animals were out together on exhibit previously, and altercations occurred. No history on introduction or integration was given.

CONSIDERATIONS

Since there is some negative history in this group already, it would be advantageous to clearly delineate the future plans of your facility and the long-term goals and needs of the SSP. At the very least, I would encourage you to implement some serious conditioning with the animals in your care.

Given the current exhibit size and the brief history gathered, some revamping to the existing area would be needed. Without complete history and additional information, I cannot properly assess this situation and could only say that the obstacles you face are serious challenges. My impression of the animals is that it would be worth a try if the groundwork is properly laid. However, the complications of working against the natural history of the animal, in integrating older animals, is a hurdle you may not be able to surmount. So, the level of commitment and degree of complexity of the situation may be more than you or your facility is willing to attempt.

ANIMAL HISTORY

History of the animals is going to be one of the most critical components for assessment. Reactions to new stimuli and other animals, stability in a group, mother-reared or hand-reared, and other factors will play an important role in assessing this. A wide variety of individuality is apparent in any species and paying attention to this will help in the evaluation of suitability.

As we are evolving in our animal keeping skills and the increased complexity of managing our animals, it is necessary that we also start to add behavioral notes to our daily record keeping. Noting who is more receptive to new stimuli, changes in dynamics, and other nuances can lend to more successful management strategies when these behavioral components are added.

These notes do not have to be long and complex, and they can be easily gleaned from observing interactions during the morning routine, upon release, and lock up, or other opportunities for viewing the activities of the group you are caring for. Noticing who is forming a coalition, changes in proximity, location dispersal within the exhibit, and any other changes are vital to long-term success. Body tension, avoidance, and other nuances can be noted in advance to avoid escalation.

Many times keepers can glean valuable information from tracking down the primary
caretakers of animals in their collection that would not be available elsewhere. In two of the evaluations that appeared in this column (with primates) over the last year, it was possible to locate important sources of information —the importer and hand-rearing staff. This helped to piece together a more complete picture to assist in devising faster more appropriate strategies for those particular individuals. Additionally, there is literature and there are individuals out there (with particular experience in this matter) who could further assist with progress in this matter.

SPECIES NATURAL HISTORY & INTERACTIONS

Noting small behavior changes is critical to safe integration. If this is not done, or if shortcuts are taken to try and force the issue, more harm is done than good. In many cases shortcuts end up costing valuable time in the long run. Many times counter conditioning and desensitization have to be done to overcome the aversive situation that has occurred. Everything becomes more time and labor intensive if you do not do the job right the first time.

Looking at the natural history of the animals and how bachelor groups form and when, can help you take advantage of naturally occurring windows of time to assist with a successful integration. Combined with the proper steps to integration, without rushing the situation, successful integration has been accomplished in several cases.

Further experience and research has shown that some stability can be gained by the introduction of properly socialized animals into a group. Integration has seemed to work best with groups if they are formed as black backs or younger....as is shown by looking at the natural history of this species. Groups will change over time, and especially of note is that there seems to be no case known of where a breeding male leaves a family group to join a bachelor group. Bachelor groups also tend not to have animals in their prime since they usually are off forming family groupings of their own.

EXHIBIT SPACE & DESIGN

One of the more critical factors will be the space and design factors of an exhibit. Areas to provide for controlled introductions and escape are critical here. To sustain a proper introduction, there should be provisions for visual contact and withdrawal without physical contact, mesh areas for controlled and limited contact (also with withdrawal options), and a complete strategy on how to introduce each animal to the other in a neutral manner.

Once the group is starting to form, strategic methods of introduction involving social considerations is important. It has been found that coalitions with younger animals can be used to help avoid problems in the introduction of older animals. However, complete strategies and contingency plans should be delineated prior to implementation.

Important factors in design will combine the following: escape areas, multiple tiers, temporary barriers, visual barriers, strategic feeding and foraging strategies, complex and variable enrichment activities, variety of substrates and mobile exhibit "furniture" and other such factors.

BARRIERS & OCCUPATION

Barriers and escape areas of various sorts can be constructed and changed. Boulders, bodies of water, ropes, logs, trees, and other components can help to deter or provide diffusion of some aggressive moves between animals.

Mental occupation and multiple strategies to introduce preferred food items,

browse, and other foraging tactics are also critical to avoid confrontations. Separate resting areas, multiple shade areas, and feeding strategies that incorporate complete separation should be considered imperative.

BEHAVIOR ACUITY

Sensitivity to gorilla behavior and social relationships is crucial to success in this matter. Knowing the day-to-day patterns and noticing slight changes or differences will be critical to avoiding and preventing serious conflicts. Relief keepers should also be astute and alert to be able to note normal patterns, changes in behavior, or any slight altercations.

CONTINGENCY PLANS

Having strategies in place to separate and control aggression, before it occurs (ideally) and after escalation, is imperative. Husbandry conditioning for separation and medical treatment will be necessary and should be firmly established prior to integration, or at least be in process during the early stages.

Stress symptoms such as changes in dietary consumption, hair loss, weight loss, changes in elimination (fecal), changes in positioning, coalitions, movements, or activity should be noted immediately since they could be symptoms of escalating situations that may not be apparent upon cursory observations.

Next Month: Further Views on Bachelor Groupings and a Suggested Reading list.

If you would like to submit a behavior question/scenario for discussion in this column, please use the guidelines published in the Aug. 1997 AKF (pg. 348-350). Requests for behavior evaluations should be sent to Diana Guerrero at Ark Animals, Inc., P. O. Box 1154, Escondido, CA 92033-1154 or directed to her e-mail address listed below.

About the Author: Since 1978 Diana has been active both in the U. S. and England working with zoos, private collections, an oceanarium, a marine aquarium, and other animal-related organizations involving captive wildlife. She has a broad base of animal experience involving movie & television training, zookeeping, show performances with live animals, education, behavior management, modification and enrichment, rescue and rehabilitation as well as captive breeding and management of endangered species. She is currently working as an Animal Behavior Consultant and Trainer with both exotic and domestic animals, she has authored numerous articles on animal behavior and training. If you have questions for Diana, you may contact her at 1-800-818-7387 or via the email listed below. ***NOTE****: The Ark Animals' Website has completed the change to Electronic Magazine Format. The "Ezine" features articles related to captive animal behavior, enrichment, conservation, and similar topics. The publisher welcomes electronically submitted articles (previously published or new work). Deadline is the 10th of the month previous to publishing. Interested parties may contact the publisher at arkabc@arkanimals.com Site address is http://www.arkanimals.com*

By Kayla Grams, Arizona-Sonora Desert Museum and Gretchen Ziegler, Sequoia Park Zoo

Not a Barrel Full of Monkeys, But a Bucket O' Laughs!

By Amy K. Maehler
Illustrated by Chris Mascrarella
Phillips Park Zoo, Aurora, IL

Community Enrichment

One of our most recent additions are two North American river otters (*Lontra canadensis*). As part of the promotion for our new otter exhibit, we invited the community to help name the otters. The names, Teeter and Totter, won the contest. What a great description for these long-bodied, fluid-like mustelides! Visitors are amused just contemplating which is which. When the contest winner, an eight-year-old girl, was asked "Which is which?", she replied confidently, "Teeter is the one with teats!". Over a year has past and the otters continue to do very well. Their exhibit is now one of our most popular.

In Illinois, otters are an endangered species and these animals have a special value as part of our collection. They have become central in our mission to promote education, conservation and recreation. The exhibit successfully entertains and educates our visitors. Our visitors discover that viewing these rare, illusive creatures and learning more about them can be more fun than a barrel of monkeys.

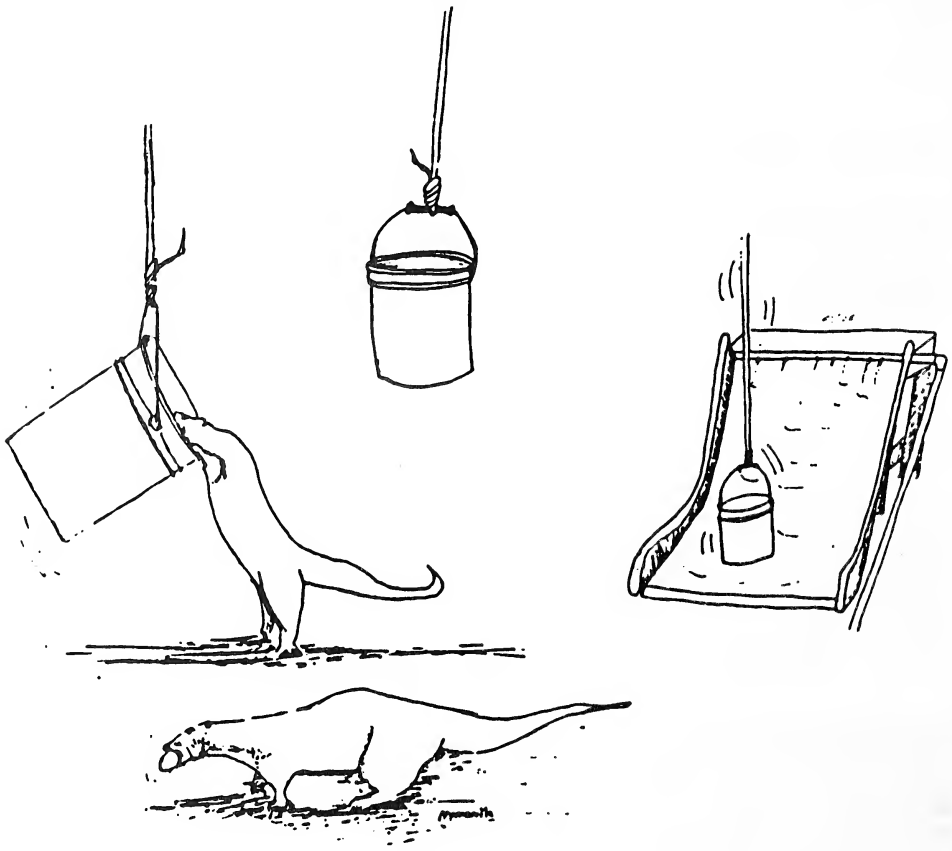
Animal Enrichment

Permanent features inside the exhibit which measures 4m x 6 m (13' x 20') are: a pool 2m x 2.5m x .3m (6.5' x 8.2' x 11.8"); a slide 1m x 1m x 1m (3.28' x 3.28' x 3.28'); two sand boxes of 1 m (3.28') diameter; a PVC tube 3m x .33m, diameter (9.8' x 1', diameter); a .33m (1') hanging tractor tire; a hanging bucket (20 L); and various trees and logs for cover.

The off-exhibit area measures 2m x 4m (6.5' x 13.1') with a box measuring .75m x .33m x .25m (2.5' x 1' x 9.8") which they use for napping. Enrichment has taken a variety of shapes and styles. Buoyant food items like carrots, and other non-food items are offered regularly. The otters do enjoy pushing items around the pool and/or carrying them into tunnels.

Visual Enrichment

Beyond the features available inside the exhibit, we have taken enrichment a step further. By locating their exhibit on a knoll, adjacent to our fowl exhibit, the otters can survey the birds. The amount of time spent tracking the activities of the fowl occupies a significant portion of their day. This visual stimulus has helped to prevent any undesirable habitual behaviors.



Out with the Old, In with the New

Changing the structures inside the exhibit, by placing new log rounds (some large enough to use as tunnels) and creating blinds of vegetation enhances their exhibit and helps to eliminate monotony. Otters in the wild are known for traveling 100-120km (62-75 miles) along streams, and in some cases over land (Ingles, 1965). Their ability to adapt quickly and enjoy new terrain is part of their nature.

Fun for Everyone

One of the longest-lasting, most successful items introduced into the exhibit, is what we call THE BUCKET O' FUN. It is a common plastic bucket (20 L) with a handle. It hangs on a heavy rope over the base of the slide and pool. The simple movement of the swinging bucket instantly interested the otters. We put food items inside a dry bucket. Our otters push it around and inspect it, regardless of its contents. The harder the push, the more dramatically it swings away - usually with the animal in hot pursuit.

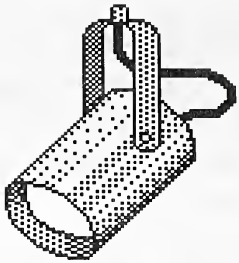
Placing different amounts of water inside changes reaction time, weight and response of the bucket. With a water line overhead, water can be added to the bucket. Simply allowing the bucket to fill and spill over is an option. To limit the contents of the bucket, holes can be drilled along the sides. Tipping or inverting the bucket full of water can produce a stimulating wave. Depending on the length of rope/height of the bucket, the otter can tip the bucket and climb inside. As the bucket teeters and totters, so do Teeter and Totter, our river otters. A bucket swinging to and fro holding an otter, quickly overflows. And so, shortly following the success of lifting themselves up into the bucket they are poured out as fluid as the water itself, sending the bucket off in one direction and the otter in another. This is followed by a roar of laughter from the crowd!

Cost - Benefit

Although a basic plastic was inexpensive and easy, the reward to the otters and the visitors has been priceless. It has been a Bucket O' Fun for everyone. At facilities that object to the appearance of non-natural materials in the exhibits, a wooden pail could work as well. One with tapered sides, not straight, may give you more of a bang for your bucket.

(Ideas appearing in this column have not necessarily been tested by the editors for safety considerations. Always think ahead and use good judgment when trying new ideas. Eds.)

Spotlight on the AAZK Ethics Committee



Submitted by Janet McCoy, Ethics Committee Chair
Metro Washington Park Zoo, Portland, OR

To better help the membership understand the workings of the Association, we will from time to time run a brief explanatory article about a committee or project, detailing its function, its operational parameters and/or its progress. If you have questions on any of AAZK's committees or projects, ask the Chair or any Board Member.

The Ethics Committee was formed to investigate any formal, written complaint and/or violations of the Code of Professional Ethics, Bylaws, or Resolutions contained in the Operations Manual of the Association, as directed by the Board of Directors. The membership may also bring formal, written charges to/or about the Board of Directors through this Committee. The format under which the Board of Directors operates for notification, submission of materials and witnesses is detailed in Article V, Sections 1, 2 and 3 of the adopted and ratified Association Bylaws.

The Ethics Committee, under the supervision of the Association's Vice-President, consists of four (4) Professional members in good standing and four (4) alternates with the Immediate Past President as Chair. Committee member's names are pulled at random from the current membership roles at the Administrative Offices of the Association during the first mid-year meeting to commence after the election of a new Association President.

The Vice-President of the Association provides the Committee with background information on the specific complaint and a time frame for the investigation of the complaint. Communication is in the form of confidential letters. The Chair ensures that both sides of the complaint are presented in a fair and impartial manner. The complainant(s) shall be given the opportunity to contribute their supporting evidence to the materials available to the Committee. The Committee has the right to call as witnesses to the complaint, to appear in person before the Committee, or submit their opinions in writing, any members of the Association they deem pertinent to the complaint. Witness participation in the investigation is at personal discretion and not mandatory to their rights as a member. Non-member participation is also at the discretion of the individual.

Upon completion of the investigation, the committee forwards the results of their investigation, including all notes and materials, to the Chair. Included in their investigation shall be a recommendation to the Board of Directors as to the disposition of the charges, which can include dismissal or disciplinary action as per the adopted and ratified Bylaws of the Association, Article V, Sections 1, 2 and 3. The Chair shall then report the initial findings to the Board of Directors for review. If so warranted, the President of the Association will conduct an Ethics Hearing in Executive Session or in a manner to be decided upon by the Board by a majority vote.

Breeding Lesser Green Broadbills at Lincoln Park Zoo

By Jill Gossett and Cheryl Beseke
Lincoln Park Zoo, Chicago, IL, USA

The lesser green broadbill (*Calyptomena viridis*) is one of 14 species of the family Eurylaimidae. This species was first kept in captivity in 1928 in London. The first captive breeding took place at the Wuppertal Zoological Garden in Germany in 1980 (Webster, 1991). The only other documented successful fledging occurred at the San Diego Zoo in 1993 (Lewis, 1996). Lesser green broadbills are found from peninsular Thailand, Malaya to Sumatra, and Borneo. Both sexes have stout bodies with short necks and a dense growth of feathers from the cere extending over most of the bill. The males are bright green with black bars on the primaries and secondaries and black dots in front of and behind the eyes. The females are a dull green and lack the black coloring.

Lincoln Park Zoo first had broadbills in their collection in 1969. The breeding pair has been together since 2 June, 1994. The renovated birdhouse was reopened in 1991 and this particular exhibit design has been conducive to breeding. The exhibit housing this pair measures 9.1m x 6m x 6m (30'x20'x20') and contains a variety of plants including *Ficus benjamina, Ficus allii, Ficus elastica, Rhapis excelsa, Spathiphyllum, Philodendron, and Epipremnum aureum*. The concrete walls are painted as a deep forest and the front is glass with a thin strip of wire mesh on either side. Skylights on the top of the building provide natural sunlight which is supplemented with halogen lights. There is one door for keeper access and a waterfall consisting of three pools. The exhibit is misted daily. Several other bird species, each a pair with offspring, share this exhibit including four crested wood partridges (*Rollulus roulroul*), four red-legged honeycreepers (*Cyanerpes cyaneus*) and three Jambu fruit doves (*Ptilinopus jambu*).

The broadbills have access to a variety of foods including cooked rice, chunks of banana, grapes, blueberries, orange, papaya, spinach, kale, bird of paradise, gel-based diet*, peas, corn-soaked dog chow, chopped hard-boiled egg with the shell, waxworms**, crickets and mealworms. In October jumbo mealworms were added to daily diet. There is another special diet for the honeycreepers which the broadbills later showed an interest in. It includes soaked monkey chow, honey, and banana topped with chopped papaya, apple, and orange.

Prior to 1995, stimulation included an artificial, domed nest measuring 12.7cm x 8.8cm x10cm) 5"x 3.5"x 4". The female entered it several times but did not lay any eggs. Keepers built a second nest constructed of cotton mesh in a tear drop shape with grasses woven through. Dried grasses, fiddleleaf ficus leaves (*Ficus lyrata*) and *Rhapis excelsa* leaves were offered loose as well as tied

in a ball with jute twine to stimulate nest building. In October of 1995 the female began to show interest in dried grasses.

The pair was nearly always more active in the early morning, during the mid-afternoon mist, and in the late afternoon. In mid-November the female was seen tapping on the side of the male's bill, though no regurgitation was observed. By December she was becoming more aggressive, perching in new places, and flying to the keeper access door and to the ground. In January new nest material was added including dried Spanish moss, excelsior, strips of brown packing paper, green tissue paper, tan streamers, and green Christmas ribbon. The female's obvious preference was Spanish moss though she did use a lot of the brown paper strips. It was at this time that the pair began to show interest in the honeycreeper diet. In February various palm fibers were added; blond coconut fibers were the most utilized by the pair.

In mid-January the female looked as though she was inviting copulation and the male frequently raised his crest. At various times the male offered jumbo mealworms to her, but the female always rejected them. There was an "aerial fight" at the end of February that might have been a precursor to copulation. At the end of February, the female was lethargic and non-attentive and she was removed from the exhibit for treatment. The male continued to call and search for her and she was returned to the exhibit on 9 March.

Live Spanish moss was added to the exhibit in mid-March and the female was immediately interested. Though there were various pre-woven nests available, she began building her own on 24 March. The male stood guard on a perch directly in front of the nest before she flew over, and while she added nest material. Initially there were just a few strands of Spanish moss draped over a limb .6m (2') from the ground, against the wall directly opposite the access door. The female always approached the nest the same way. After circular flights at the top of the exhibit, she flew low to the ground across the front of the exhibit, then to the back of the nest (which eventually became the entrance) and finally perched on the top of the nest. She then would climb, while flapping her wings, around the bulk of the nest and weave fibers into it. Eventually rope fibers were offered and the female used it almost as much as the Spanish moss. Because the tail hung to the ground and the creased wood partridges kept becoming entangled, keepers cut it several times before its completion. The female never seemed to mind nest manipulation or cleaning in the area.

In April the female fluttered in front of the male several times, but no attempt at copulation was observed. A crude cavity appeared in the nest and the male stood guard while the female was inside. It was around this time that the male began to molt. The female continued to add to the nest until the beginning of May when she began a second nest. The second nest was also against the wall opposite the door and was anchored on the stalk of a palm leaf .9m (3') off the ground. It was mainly constructed from rope fiber, Spanish moss, and dark, coarse palm fiber. The female created a hole in the second nest by pushing brown packing strips all the way through. Rope fiber was eliminated because

the crested wood partridges kept becoming entangled. The brown paper strips were also eliminated because they weren't flexible enough.

By the end of May, the female had begun her molt and nest activity ceased. In the beginning of August, both adults' molts were complete. The female's plumage seemed whiter than before, especially in the area of the cloaca. The males plumage, too, was brighter but it was indiscernible if the bars on his wings had changed at all. The female had ripped apart the second nest and finished construction of the first nest. She also began collecting *Ficus allii* leaves and lining the nest with them. Fresh green leaves were offered, but she seemed to prefer the dry. Several days later she was seen in the cavity pulling fibers up to shape the entrance and on 23 August two eggs were confirmed.

The male was left in and he guarded both the nest and the female while she was inside, but he never had any active part in nest building or incubation. Throughout incubation, use of the misters was reserved for when the female emerged from the nest because she enjoyed bathing. In fact, she would immediately fly to her normal bathing perch in anticipation of a shower. The male continued to displace and chase her. On 8 September the male was unusually vocal. On 9 September the female was spending more time off the nest and hanging on the edge of the nest entrance with her head inside. On the 10th the female flew out of the nest with an eggshell. Examination of the shell fragment indicated a perfect hatch. The width measured approximately 19.0mm (3/4").

The female usually fed the chicks before 0800 hrs. and continued at various times throughout the day. She most frequently chose waxworms and papaya followed by mealworms and avocado (the latter had been added to their diets a few days prior to the hatch). The male was not observed feeding the chicks though he did still guard the female and the nest site. On the 16th the female began spending all her time out of the nest and the chicks could be heard begging for food. On the 18th, at 11 days old, the chicks' heads could be seen protruding from the nest when the hen fed. The crested wood partridges were removed from the exhibit on the 20th to prevent them from interfering with the chicks. It was noted the broadbill chicks had bluish-green skin and were covered with a small amount of down but no feather tracts were visible. At 20 days, it was observed that the chicks were fully feathered. On the 28th the male was observed next to the nest, watching and calling. No chicks were visible at the time. At 22 days of age, the first chick emerged from the nest. There was concern for the second as the bill was visible but did not seem to move. However, by mid-afternoon it was perched on the rim of the nest entrance and after a few minutes, it fledged. Both chicks' bodies were grayish green with light gray on the underside. Their tail feathers had not yet emerged. Both had yellow beaks with black at the tips.

After the chicks fledged, the male's role expanded and he was observed guarding and feeding the chicks though the female still provided the majority of the chicks' nourishment. The chicks' diet remained approximately the same, mostly

waxworms, papaya, mealworms, and avocado though a variety of other fruits and vegetable were offered. On the fifth day after fledging, the hen laid a piece of papaya on the perch next to the chick who picked it up and ate it. On 7 October the chicks were obviously more aware than before and the female appeared to be trying to wean them. On 9 October the female was observed at a food dish showing a chick how to pick up food, but the female continued to feed the chicks.

The chicks found leaves and sticks irresistible as play things and were seen drinking from leaves when the misters were turned on. Both chicks enjoyed the mist spray and bathed as enthusiastically as the adults. On 7 October one of the chicks was seen mimicking the 'goik goik' head bobbing call of the adults, but no actual vocalization was heard. On the 11th, both chicks were observed head bobbing and 'goik goik' calling. Additionally, on 8 October one chick was observed aggressively chasing a Jambu fruit dove off a perch.

Throughout October all four were frequently seen perching together and behaving as a family unit. By the end of October the chicks were fully weaned. On 29 October all four were caught and the chicks were banded and blood feather sexed. The chick that was later determined to be female weight 57.3gm (2.02 oz). The other chick, a male, weighted 56.9gm (2.01 oz).

By the end of November both adults began exhibiting signs of aggression toward the chicks and the adult female began showing interest in nest material. In the beginning of December the adult female was observed with grasses and fibers in her beak. She flew from perch to perch beating them against a branch while the juvenile female seemed to mimic her. Subsequently the juvenile female was often observed manipulating nest material. In early January the juvenile female was on the same branch as the nest holding grass strands in her beak. On 10 January 1997, at 123 days, the chicks were taken out of the exhibit. The male weighed 51gm (1.8 oz) and the female, 60gm (2.12 oz).

Throughout the pair's breeding cycle, various vocalizations were heard. Most were produced by the male. The most common was the goik goik call, with or without the head bob. This is done by both the male and female but the male is usually louder. It seems to be the basic communication, the "where are you?" call. The degree of display or volume seems to change the meaning of this call on occasion. For example, when the female was reintroduced to the exhibit on 9 March, every feather on the male's body was erect, including his crest, and he called loudly. His body was very rigid with extreme excitement. A variation of this call, heard only from the male, includes a squeak between each call when the head bobs back up. There is also the male's ascending trill call, which may be associated with danger or excitement and was frequently heard when the male chased the female during misting. Another vocalization is the soft purring call, similar to the trill but not ascending. Only the male has been heard performing this call. His throat feathers are erect during the purr call, which was performed mostly in the late afternoons after the chicks had fledged. The male also made some unusual vocalizations just after the chicks fledged that

had not been heard before or since. He made a high squealing 'caa'" almost like a chicken. It was heard when the male was agitated, possibly because the chicks had only recently emerged from the nest. The female made a low, softly pulsating call while she fed. One last call to be noted is the 'Tarzan' call, performed only by the males when they were housed without females.

Some of the things we felt were important include:

1) Privacy and security for nest site.

2) Proper diet. Sufficient insects offered, especially jumbo mealworms.

3) Acceptable nesting material including Spanish moss, soft fibers and even fresh grasses.

4) Daily misting.

5) One of the most important things seemed to be to provide constant stimulation. Any kind of activity or change is a stimulus.

* Gel-based diet consists of ground extruded, chopped fruits and gelatin.

**Waxworms are kept for three days on a special, nutrient medium.

References

Lewis, E. (1996) Captive Breeding of the Lesser Green Broadbill. Aviculture Magazine Vol. 102, No. 1:1-5

Webster, R. (1991) The Broadbills: An Overview of the Eurylaimidae with emphasis on the Lesser Green Broadbill (*Calyptomena viridis)* in the wild and in captivity.

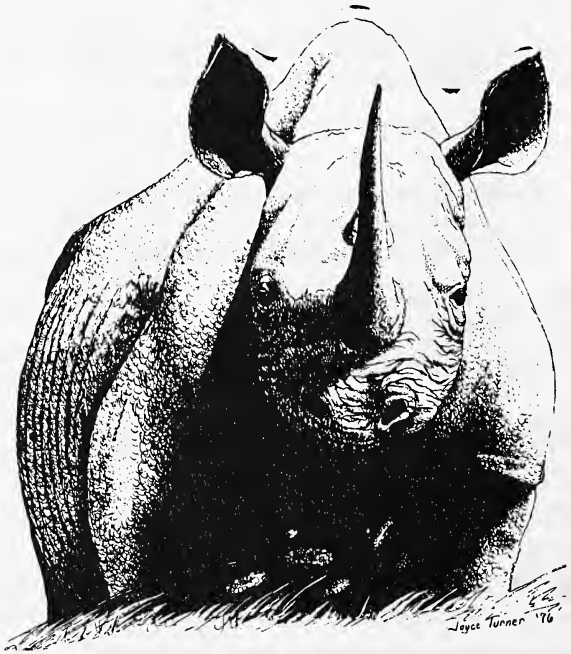
Results of an Effective Conditioning Program for Rhinos

by
Dana Nicholson
Milwaukee County Zoological Gardens
Milwaukee, WI

Effective management of some animals, particularly mega-vertebrates, can present many problems. The training and conditioning of our rhinos has facilitated veterinary care and increased opportunities for research. Every aspect of our rhino conditioning program has been keeper-initiated with the support of the senior animal staff.

Our goals were to have voluntary cooperation for blood draws and the ability to perform basic husbandry or veterinary procedures without mechanical or chemical restraint. The programs used at the Milwaukee County Zoo have accomplished this in a relatively stress-free environment, which is critical when doing metabolic or hormonal research. We are now able to obtain samples or do procedures in a timely and repetitious manner. Specific strategies need to be developed for the individual rhino. Some are very tractable and seemingly enjoy zookeeper interactions, while others are not so manageable. Less tractable animals require more intense work, but many of the problems can be overcome.

Our ability to obtain blood samples twice a day from our female black rhino while in estrous will enable research to be done using species-specific protein hormones. We are currently supplying multiple serum samples to reproductive researchers attempting to isolate rhino fertility hormones. If successful, the impending ovulation can be determined using luteinizing hormone levels. An early diagnosis of pregnancy can be made if chorionic gonadotropin is found to exist and isolated as well. Another reproductive biologist is trying to assess the hormone relaxin as a potential pregnancy indicator in rhinos. None of these sample collections have interfered with any of the normal breeding interactions.



We provided sequential samples to another endocrinologist studying the serum steroid patterns in our female black rhino. The analysis monitored the ovarian activity throughout her pregnancy and birth.

In the past, we have collected milk samples from our lactating rhino and are presently in the process of collecting semen from our bull. The principal investigator hopes to get to the point where semen freezing and thawing techniques can be improved.

To date, our pair of wild-caught black rhinos have produced two offspring. The first calf was transported to the Western Plains Zoo in Australia. He had been conditioned to accept blood draws and hand injections. He also allowed routine oral and rectal exams to be performed. The institution that receives our most recent calf will have the opportunity to perform routine veterinary care, blood draws, ultrasonography, and minor foot care, if required.

We have also worked extensively with an Indian rhino. In the fall of 1991 we received a surplus male with severe foot problems.

It was apparent that he was a very tractable animal. After a couple of weeks of acclimation, he allowed us to enter the stall. We were able to scratch him down into lateral recumbency. Pododermatitis, along with a total separation between the sole pad and middle nail was confirmed on both rear feet.

This rhino turned out to be labor intensive, requiring veterinary care on many occasions. In the five years that we maintained this animal he was immobilized six times. He went through five surgical procedures on his rear feet and once for a root canal on a fractured incisor.

Unlike our black rhinos, conditioning of the Asian rhino was strictly for medical management. He allowed blood sample collections and injections using an ear vein, after being scratched down. Keepers would work on his feet at least once or twice a week. After the foot surgeries, daily care was required to repair dressing and cast materials. He has since been sent to The Wilds in Ohio, with the hope that a milder climate and different substrate environment will improve his condition.

The results obtained show that normally unpredictable animals can be evaluated and handled in a safe and protected-contact manner. The application of positive reinforcement enables procedures that were once considered invasive to become part of a daily routine. Conditioning can be used as a valuable management tool that enables us to provide the best of care with a lot less stress.

Legislative Update

Compiled by Georgann Johnston
Legislative Advisor
Sacramento, CA
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South Africa Holds Off on Culling Elephants

The National Parks Board of South Africa has announced that it was not considering culling any elephants in the Kruger National Park. Questions about the possibility of culling were raised by members of the South African parliament and the Minister of Environmental Affairs and Tourism, Pallo Jordan, stated that "after extensive consultation with communities neighboring the park, a renewed elephant management policy for the Parks Board had been drafted." While culling and sale of the resultant ivory is still a possibility in the future, Jordan stated that no culling would occur before scientific evidence was gathered and a firm policy was in place.

Source: South African Star Newspaper 22 September 1997

ESA Listing Denied for Queen Charlotte Goshawk

The Queen Charlotte goshawk (*Accipiter gentilis laingi)* is a subspecies of the northern goshawk. While northern goshawks range throughout the temperate forests of North America, Europe and Asia, the Queen Charlotte is found only in southeast Alaska and British Columbia.

Over one year ago, a petition was filed with the U. S. Fish and Wildlife Service (USFWS), requesting that the Queen Charlotte goshawk be considered for listing under the Endangered Species Act. The petition, endorsed by approximately 20 conservation groups, claimed that timber harvests in the Tongass National Forest was adversely affecting this subspecies. USFWS issued an initial 90-day finding endorsing further investigation into the bird's status. Now, after a further 12-month investigation, the USFWS has ruled that listing this subspecies as endangered or threatened is not warranted.

In its finding, the USFWS noted the difficulty of censuring these birds and stated that no reliable population estimates or population trend data are available. However, the Service's report did say that "recent research has shown that the Queen Charlotte goshawk has a strong association with productive old-growth forest, where it usually nests, spends the majority of its time, and which provides habitat for most of the hawk's important prey species. Therefore, harvest of productive old-growth forest is likely to adversely affect the Queen Charlotte goshawk."

In 1995, Canada and the Province of British Columbia added the subspecies to their "red list" of candidates for endangered or threatened status. The Service's decision to decline listing the bird was based primarily on consideration of the

proportion of productive old-growth forest that has been, and is projected to be, affected by logging. In effect, it was decided that enough old-growth forest is under protection to sustain the subspecies for the foreseeable future.

Source: Federal Register, 4 September 1997 (Volume 62, Number 171)

ESA Downlisting/Delisting of Hawaiian Hoary Bat Being Considered Comment Period Open Until 24 December 1997

The Hawaiian hoary bat (*Lasiurus cinereus semotus*) is a subspecies found only on the islands of Hawaii, Maui, Oahu, Kauai, and Molokai. Population numbers are not known and there is a general lack of historic or current data regarding the subspecies or its present status. Because of those factors, coupled with the fact that the bats have been sighted only on Kauai and Molokai in recent years, the subspecies was listed as endangered under the Endangered Species Act.

Now, the USFWS is considering downlisting the species from endangered to threatened or completely delisting the subspecies entirely. Before such a decision can be made, the Service is asking for data concerning the Hawaiian hoary bat's distribution, abundance, and habitat needs. Research addressing these questions must be undertaken prior to consideration of delisting or downlisting.

In furtherance of the investigation, the USFWS has prepared a draft recovery plan concerning this bat. Copies of the plan are available for review by writing to Brooks Harper, Field Supervisor-Ecological Services, U. S. Fish and Wildlife Service, Pacific Islands Ecoregion, Room 3108, 300 Ala Moana Boulevard, P.O. Box 50088, Honolulu, Hawaii 96850 (phone: 808/541-3441). Comments on the plan to downlist/delist the species must be received in that office no later than 24 December 1997.

Source: Federal Register 25 September 1997 (Volume 62, Number 186)

ESA Threatened Status Denied to Alexander Archipelago Wolf

A finding issued by the U. S. Fish and Wildlife Service states that listing of the Alexander Archipelago wolf (*Canis lupus ligoni*) as threatened under the Endangered Species Act is not warranted. The subspecies occurs on the mainland in southeast Alaska and on all but three of the major islands in the Alexander Archipelago. The decision not to list the subspecies as threatened was based on the fact that the USFWS believes the current population of Alexander Archipelago wolves to be stable; despite the fact that the exact population size is not known. Estimates of population range from 750 and 1,500 individuals and about 67 percent of the subspecies population is estimated to live on the islands in the central and southern portion of the archipelago.

The Service recognized that the primary threats to the survival of the wolf include human-caused mortality, disease (primarily distemper), loss of prey as a result of timber harvest, and loss of prey (Sitka black-tailed deer, beaver, and wild goats)as the result of severe winter weather.

Source: Federal Register 4 September 1997 (Volume 62, Number 171)

Public/Private Factions Dispute Proposed Mozambique Game Reserve

A proposed 4.5 million hectare (180,000 sq. miles) game preserve, located across northern Mozambique from Lake Malawi to the Indian Ocean, is having trouble becoming a reality due to ongoing disputes between a number of interested parties. The area includes an already existing Niassa game reserve, 21,000 sq. km. (8100 sq. miles), which is stocked with more than 10,000 elephants and possibly rhino, though the last rhino sighting was in 1993. In 1995, Mozambique's National Department of Forestry and Wildlife began working on a management plan for the area in conjunction with Grupo Madal, a conglomerate owned by a Norwegian shipping tycoon, with economic ties to Mozambique.

Concurrently, the South African Chamber for Agricultural Development (SACADA) would also like to take over management of the reserve. "The government will own it, except for a few concessions, and we will run it", says Jan Pelser, a South African game rancher. A third group interested in the development of the reserve is Mosagrius which has presented its own proposal for the game reserve.

Right now, Grupo Madal has control of most of the Niassa reserve along with 50,000 hectares (124 acres) of buffalo and cattle ranches and palm plantations in Zambezia province. It has set up the Society for the Management and development of the Niassa Reserve with additional interested parties being the Mozambican government and some rural communities surrounding the land.

South Africa, through SACADA, has issued an ultimatum saying that no development will go forward without the approval of the national government in Pretoria, South Africa. However, Madal appears to have the backing of officials in power in Maputo, Mozambique, and that is where the land actually lies.

Source: South Africa Weekly Mail & Guardian Newspaper 15 August 1997

Effort to Rewrite Endangered Species Act Stirs New Controversy

Environmentalists are generally negative toward the current Senate bill to revise the Endangered Species Act, produced by an unlikely alliance of conservative Dirk Kempthorne, R-ID, and environmentalist John Chafee, R-RI, and endorsed by Interior Secretary Bruce Babbitt. Reactions have ranged from calls for further changes to the bill to demands for Babbitt's resignation. Last week *The New York Times*, on the other hand, editorialized that the bill is "a bird in the hand" and may be better than nothing. Check these web pages for analysis and updates from ESA experts:

National Wildlife Federation's John Kostyack, at http://www.nwf.org/endangered/alerts/esaalrt.html

GREEN's Roger Featherstone, at www.defenders.org/grnhome.html

Environmental Defense Fund's Michael Bean, at www.edf.org/pubs/NewsReleases/1997/Sep/k_esa.html.

Source: EICACTION 10-6-97

REACTIONS

A Question and Answer Forum for the Zoo Professional on Crisis Management

By William K. Baker, Jr., Zoologist
Lufkin, TX

QUESTION
Can the type of footwear worn in the Zoo Keeper work environment make a difference in personal safety?

COMMENTS
Over the years I have observed zoo keepers wearing everything from name-brand athletic shoes up to and including backpacking boots. From what I have seen over time, I would say that it has always been a matter of personal choice when it comes to footwear. In retrospect, I would have to say that if what you're wearing works, then stick with it. However, this comes with the following proviso: Use footwear that is appropriate for the daily work environment. The reason is that in certain circumstances it could make a difference when considering safety. Examples would be:

1. Zoo keepers and marine mammal trainers who work in an aquatic or wet environment often wear neoprene dive boots or wet shoes. This is because these types of footwear tend to provide solid traction and a degree of protection in the work area. The "gripping tread" rubber work boots are especially popular with zoo keepers who have to hose down animal exhibits throughout the day and shift back to "dry" footwear.

2. In my experience, zoo keepers always seem to be involved in repairing or building something. In those situations the steel toe workboot is a popular choice. It's no accident that they are regularly used by tradesmen in the construction industry.

3. If a zoo keeper finds it necessary to cross or climb fences on a regular basis or work on a variety of substrates, then a day hiker or an approach style shoe would be a good choice. These styles tend to offer solid traction in a wide variety of conditions. The only problem I have found is that some of the day hikers have large rounded toes and will not fit into the "diamonds" of cyclone fencing. As a result, this makes climbing quite a challenge.

Unfortunately, there really isn't an all-purpose shoe that is manufactured for use in the zoological work environment. The closest parallel are the shoes and boots manufactured for the backpacking industry. These styles are designed with the outdoors in mind and usually offer good stability, ankle support, and traction. But, each of the three styles currently manufactured has its own relative strengths and weaknesses:

Approach Shoes - Designed for fast and free movement, they are popular for walking, mountain approaches, bouldering, and light climbing. Their main strength is versatility over a wide variety of terrains. Their weakness is a lack of ankle support and comfort over long distance walking.

Day Hikers - Designed for use during lightweight day hiking. This style offers more support and water resistance than approach shoes. Their strength is the ability to provide comfort and support during a full day of walking. The main weakness is that ankle support will vary due to the style of the upper (low-cut, mid-cut, and high-cut).

Backpacking Boots - Designed for use during long-term backpacking trips. t\Their strength is comfort and solid support while carrying a heavy load. Their weakness is a high center of gravity due to the increased outsole and tread.

The down side to all of this is that quality and performance tends to vary from manufacturer to manufacturer. Also, every company likes to believe that their design has an angle or feature that sets it apart from the others on the market. For general zoo work, I prefer a day hiker that has a mid-cut upper, cordura nylon and leather construction, pointed toe, and a downsized outsole that incorporates a zig-zag tread pattern. This tends to provide solid traction, water resistance, and enough flexibility to climb. Usually this style provides good service over a variety of substrates (including limestone).

NEXT MONTH: What type of safety precautions should staff members take in advance of animal restraint situations?

If you would like to submit a question for this column or have comments on previously published material, please send them to: Reactions/AKF, 635 S. W. Gage Blvd., Topeka, KS 66606-2066.

(About the Author: Since 1985 Bill has been active in the fields of sceence, zoology and wildlife management. His education and expereince include a B. S. in wildlife management and post-graduate work in zoology; Lab and Museum Assistant; Shoot Team leader, ERT Member, and Senior Keeper and Large Mammal Keeper at various AZA facilities. His area of research is crisis management in zoological institutions, which draws upon practical experience and training as a Rescue Diver, Hunter Safety Instructor, NRA Firearms Instructor, and Red Cross CPR / First Aid Instructor.)

Book Review

Lizards (Vol. One and Vol. Two)
by Manfred Rogner
German edition 1994 Eugen Ulmer Gmbh & Co.
English edition 1997 Krieger Publishing Co., Malabar, FL
(translated from the original German by John Hackworth)
Vol. one - 317 pgs. 118 color photos, 21 drawings
Vol. two - 308 pgs. 124 color photos, 8 range maps
Hardcover price: $140.00 set

Review by Ken Naugher, Zookeeper
Montgomery Zoo, Montgomery, AL

This two-volume set was intended to fill the gaps in husbandry information currently available to the herpetoculturist. It was a massive undertaking with the intention of describing all known lizard families with captive husbandry and breeding information. A total of 711 reference were cited in the process.

Most of the 242 color photos are high quality, first published works. The books are 6"x9" in size, and are printed on high quality, acid-free, glossy paper. This set was translated from German and many British spellings were used in the translation. Volume One begins with a chapter on general care and husbandry of lizards in captivity. This section includes good introductory information with an excellent coverage of lighting in the vivarium. A detailed discussion of temperature-dependent sex determination was impressive, but no references were cited for this entire section.

In Volume One, five families, 99 genera, and 208 species are covered. Each species account follows the same format of distribution, description, habits, lifestyle, husbandry, and reproduction. The majority of space is devoted to 21 species of *Phelsuma* and 28 species of *Anolis*. However, excellent coverage is provided for geckos, flap-footed lizards, agamas, chameleons, iguanas, basilisks, and anoles.

The second volume of this set covers crocodile lizards, gila monsters, legless lizards, plated lizards, sungazers, skinks, night lizards, tuataras, and crocodilians. Yes, that's right crocodilians. At first glance I thought it quite odd and misguided to include crocodilians in a book devoted to and entitled "Lizards". The author explains that he included these animals at the request of the publisher. He also gives a rare view of their inclusion in this volume by calling them "armoured lizards", due to the appearance of a "bony" skin. While defensive at first, now I think including them added to the completeness of this set and provides an unusual perspective which is often absent from professional publications. Rogner describes all three families, eight genera and 22 species.

Most accounts are very brief, but the more common and the smaller species are described in good detail. Excellent husbandry and breeding data are provided for *Osteolaemus* and *Paleosuchus.*

This volume covers 17 families, 61 genera and 219 species of lizards, including 25 species of *Varanus* and 34 species of *Lacerta.* The bibliography consists of 339 references, mainly European publications. some accounts are very brief. This is the case for the data on *Varanus salvator, V. prasinus, V niloticus, Crocodylus siamensis, C. moreletii and C. rhombifer.* Much husbandry data was excluded for these species. In addition, it seems much information gleaned from U. S. collections was not included. Recent U. S. zoo breeding data for *V. dumerilii* was not mentioned. However, data on many poorly known species such as *V. spenceri* and *V. glebopalma* are included. Excellent husbandry information is provided for *Shinisaurus, V. mertensi, V. similis, Zonosaurus, Cordylus, Lacerta and Spehenodon punctatus.* The only major complaint I have with this volume is the exclusion of two very important monitor lizards: *V. salvadorii and V. komodensis.*

This is a very comprehensive work. In my opinion, this two volume set is superior in quality and quantity to any book on lizard husbandry currently available. The retail price seems a bit high, but some book dealers are offering the set at a 30% discount. The set is well worth the price.

Furthermore, Krieger Publishing should be commended for making this book available in English.

Large Animal Anesthesia - Principals and Techniques, (2nd ed.)
By T.W. Riebold, D.R. Geiser, and D.O. Goble
Iowa State University Press
2121 S. State Ave., Ames, IA 50014-8300
304 pp. Hardback Price:$39.95

Review by Sandy Wilson, DVM, MS
Staff Veterinarian
Montgomery Zoo, Montgomery, AL

This veterinary textbook is a useful guide to all aspects of large animal anesthesia. Brief descriptions are provided for all of the commonly used sedatives, tranquilizers, analgesics, and anesthetic agents. Carfentanil, etorphine, and their reversal agents, however, are not covered. Technicians will find the chapter on anesthetic equipment to be very helpful, and anesthetic emergencies and patient monitoring are covered quite thoroughly. Information on two seldomly covered topics, post-recovery complications, and euthanasia, is provided as well.

The outline format makes this book easy to study and useful as a quick reference. The illustrations are very well done, especially in the chapter on local anesthesia. Sources of drugs and equipment are provided in the Appendix section. Although written for the veterinarian, technicians, zookeepers, and anyone involved in zoo immobilization procedures will find this to be a valuable reference.

Cincinnati Zoo Sumatran Rhino Pregnant

The Cincinnati Zoo and Botanical Gardens (Cincinnati, OH) is proud to announce the pregnancy of its female Sumatran rhinoceros, Emi. This is the most outstanding event in the history of the Cincinnati Zoo and the most significant breeding of any large mammal in our century. There has not been a Sumatran rhino (*Dicerorhinus sumatrensis)* bred and born in captivity since a reported occurrence in 1889 in the Calcutta Zoo (an occurence that was the first rhino birth of any species to take place in captivity). The Sumatran rhino has become the most critically endangered of all rhino species, and even possibly of all megavertebrates, on earth.

Home of the only three Sumatran rhinos outside their native Southeast Asia, the Cincinnati Zoo has documented breeding activity resulting in the first confirmed pregnancy of a captive-bred Sumatran rhino in 108 years. Area Supervisor Steve Romo and Zoo Veterinarian Dr. Mark Campbell have been working with the diet and husbandry of these animals for the past seven and a half years in the hopes that mating would take place. However, as can be the case with larger captive animals, aggressive behavior can occur when male and female rhinos are introduced to each other for mating. If the female is not receptive, this aggressiveness could pose a threat to her well-being. This can be avoided if the female is only introduced to the male during estrus, when she is most likely to be receptive.

Detecting estrus in a Sumatran rhino is very difficult. In rhinos it only lasts about 24 hours, compared to several days in horses, cats, and dogs. With the help of Dr. Terri Roth and her CREW (Center for the Reproduction of Endangered Wildlife) staff, a new ultrasound machine was used to visualize Emi's ovaries. By performing the rectal ultrasound procedure daily, CREW scientists watched as the follicles grew and ovulated, thus confirming that the female was showing reproductive activity.

Emi was then introduced to Ipuh, the zoo's male Sumatran. Breeding activity was noted on two occasions and as a result, Emi has become pregnant. Because very little is know about the gestation period of these animals, tentative due date is thought to be January or February 1999.

The most primitive of all rhinoceros species, the Sumatran rhino is related to the wooly rhino that lived during the last Ice Age. Unfortunately, numbers have declined at least 50% in the last 10 years. With less than 400 Sumatran rhinos remaining in the wild (in about 65 isolated pockets throughout Asia) and only 18 in captivity, the future of this animal is very bleak. Loss of habitat is a significant cause, but the poaching of rhino, and especially Sumatran, for its horns is the major problem. Rhino horn currently outvalues gold on the black market.

Because the few animals left in the wild are spread over such a large area, the groups are very small and must be closely managed so that they do not become inbred and die off. And the small captive population is closely managed as well to help maintain gene pool diversity.

Thus, the importance of a Sumatran rhino calf is threefold: captive breeding can help maintain diversity in the gene pool and provide a resevoir of new animals that can possibly be reintroduced into the wild; this calf is the product of long and intensive management and research efforts resulting in new knowledge that will hopefully contribute to the breeding of other rhinos in captivity, as well as help manage wild populations; and finally, having a baby Sumatran rhino on exhibit at the Cincinnati Zoo will help educate all levels of society on the pight of this endangered species and hopefully attract support for programs to ensure its future in the wild. *Press Release 10/16/97*

Red Data Book Explained

The World Conservation Union (International Union for the Conservation of Nature) maintains a species status list through its Species Survival Commission. This system was introduced some 30 years ago and is widely recognized internationally. The Red Data Book lists provide an easily and widely understood method for highlighting those species under higher extiction risk, so as to focus attention on conservation measures designed to protect them.

The objective of this evolving system is to provide an explicit, objective framework for the classification of species according to their extinction risk. The most recent revisions of this system were approved by the 40th meeting of the IUCN Council in Gland, Switzerland in November of 1994.

Information by country, species and status is available on the Internet through the World Conservation Monitoring Center in Cambridge, UK; their Internet Web Site address is: http://www.wcmc.org.uk
General e-mail can be addressed to: info@wcmc.org.uk

Classification Categories

—Extinct (EX) : A taxon is extinct when there is no reasonable doubt that the last individual has died.

—Extinct in the Wild (EW) : Known to survive in cultivation, in captivity or as a naturalized population well outside the past range. Presumed to be extinct in the wild when exhaustive surveys have been conducted in known or expected habitat.

—Critically Endangered (CR) : Facing an extremely high risk of extinction in the wild in the near future.

—Endangered (EN) : Not (CR) but facing very high risk of extinction in the wild in medium-term future.

—Vulnerable (VU) : Facing a high risk of extinction in the wild in the medium-term future.

—Lower Risk (LR) : Evaluated as not meeting the above classification criteria and falling into one of the following categories:

Conservation Dependent - The subject of taxon-specific or habitat-specific programs, the cessation of which would result in it qualifying for one of the threatened categories above within a period of five years.

Near Threatened - Not qualifying for Conservation Dependent, but which are close to qualifying for it.

Least Concern - Species which do not qualify for the above two categories.

For most living things insufficient data (Data Deficient) is available to make reasonable determinations of their status. This does not imply that they are lower risk but that data on abundance and/or distribution is lacking. In many instances a species has simply not been evaluated against the above criteria. Enormous amounts of work are left to compile adequate status reports for most species.

reprinted from The Pepper Bird, the newsletter of the Society for the Renewal of Nature Conservation in Liberia, 45375 Escalanta Ct., Temecula, CA 92592.

Currently Available Videos/Recent Publications

NEW! Now available from the Zoo Nutrition Center: training tape modules covering Basic Nutrition and Commissary Management. Basic Nutrition (5 units) covers water, energy, carbohydrates, proteins, fats, vitamins and minerals. Commissary Management (2 units) covers topics such as food safety, building layout, equipment, pest control, etc. Each tape has a 15-20 minute run-time and can easily be incorporated into short meetings. Basic Nutrition - $200.00; Commissary Management - $100.00 or get both modules for $250.00. For more information, contact Dr. Wendy Graffam, ZNC, Wildlife Conservation Society, 185th and Southern Blvd., Bronx, NY 10460; (718) 220-5891; e-mail: wgraffam@wcs.org

RHINO TAPE - This 19-minute video chronicles the operant conditioning training techniques used with rhino at the Rolling Hills Refuge in Salina, KS. Training program allowed animal care staff and veterinary staff to work with these rhinos for medical procedures/daily husbandry protocols without use of anesthesia. This video demonstrates the training techniques used. Copies of this video are available for $12.00 by sending your request to: Steven C. Kaup at Sunset Zoological Park, 2333 Oak St., Manhattan, KS 66502. Please make checks/money orders payable to: Sunset Zoological Park Education Fund/Rhino Training Tape.

Large Bear Enclosures - A compilation of papers from the International Workshop on Captive Bear Management held in The Netherlands in 1995. Edited by Paul Koene and published by the International Bear Foundation, Rhenen, The Netherlands. ISBN 90-803197-1-6. Workshop participants gathered from all over Europe to exchange information about captive bear management, zoo displays, and the bears themselves. *Large Bear Enclosures* is a collection of their experiences and expertise, views and opinions. The contributions deal with all eight bear species, but focus especially on Brown bears (*Ursus arctos*). The book also contains the conslusions that were formulated during the separate workshops about management and enclosure design, research, conservation and education. Contact: The International Bear Foundation, c/o Ouwehands Dierenpark, Postbus 9, 3910 AA Rhenen, The Netherlands.

Zoos, Aquariums, Reserves, and Other Natural Attractions in the Jakarta Region

by Robert Berghaier
Zoological Society of Philadelphia
Philadelphia, PA

The Indonesian province of Western Java, along with its capital Jakarta, has a population of over 43 million people. With 910 persons per square kilometer, the region has one of the highest population densities in the world. In spite of the obvious pressure on natural habitats that such numbers of people produce, the region contains some exceptional natural areas. I have previously presented my impressions of the Ujung Kulon reserve, which is located in West Java, so this article will concentrate on other potential destinations that may interest the ecotourist.

The Ragunan Zoo is located in the southern suburbs of Jakarta. Supported by the local provincial government, the facility opened in 1966 and covers 135 hectares (.52 square miles). The collection numbers over 4000 individuals (about 2000 of which are birds), with 400 different species represented. Nearly all of the reptiles, birds, and most of the mammals are indigenous to Indonesia. There are, however, some notable exceptions. Animals such as white rhinos, Arabian oryx, addax, giraffe, zebra, camels, chimpanzees, lemurs, lion, cheetah, white tiger, and hippopotamus are present in the collection.

A foreign visitor might find the Indonesian fauna at the zoo to be of most interest. These include breeding Komodo dragons, a large group of babirusa (including nearly 20 of both sexes and all ages in one paddock), anoa, banteng, sun bear, cassowary, rusa deer, thirty plus orangutans (mostly Bornean), gibbons, siamang, langurs, macaques, tapir, Sumatran elephant, tiger, and rhino among others.

The animal exhibits in Ragunan range from good (for example the original older moated cat exhibits), to adequate (the public ape grottos), to the pitiful small carnivore and primate cages. What intrigued me the most about Ragunan were the numerous small wild animals and birds I saw on the grounds. These included lizards, geckos, toads, snakes, plantain squirrel, spotted dove, Javan myna, Eurasian tree sparrow, magpie robin, red-breasted parakeet, and yellow-crested cockatoo.

The zoo has a new director, Dr. Atje D. Salfifi, who is a landscape architect by profession. The zoo has always been underfunded, so he has a difficult job ahead trying to convert the older rundown exhibits into more naturalistic displays. He also has plans to convert part of the zoo grounds into a combination nature trail and botanical garden. This would serve a valuable purpose since little natural habitat remains within the city limits. Over two million visitors come to the Ragunan every year, so the zoo has a great opportunity to act as an urban environmental center. The zoo's admission fee is deliberately kept low so

the average Jakarta resident can afford a visit. A volunteer organization, "Sahabat Satwa" (Friends of the Zoo), has provided much needed assistance to help upgrade the facility.

The Taman Safari is a privately run park located an hour south of the city in Cisarua. It consists of a large drive-through safari, some large primate and reptile enclosures, a large walk-through aviary, and smaller but adequate cages for cats and small mammals.

The safari park has some of the more common denizens of similar institutions found in North America, Europe, and Australia. These include lions, brown bear, camel, zebra, giraffe, nilgai, and other assorted antelopes and deer. There are some noteable local touches too; instead of ostriches, there are cassowaries; and the tigers and elephants are of the Sumatran subspecies. There is also a Sumatran rhino paddock that is part of the auto route. I am certain Taman Safari has the world's only representative of that critically endangered species that can be viewed via the comfort of your car.

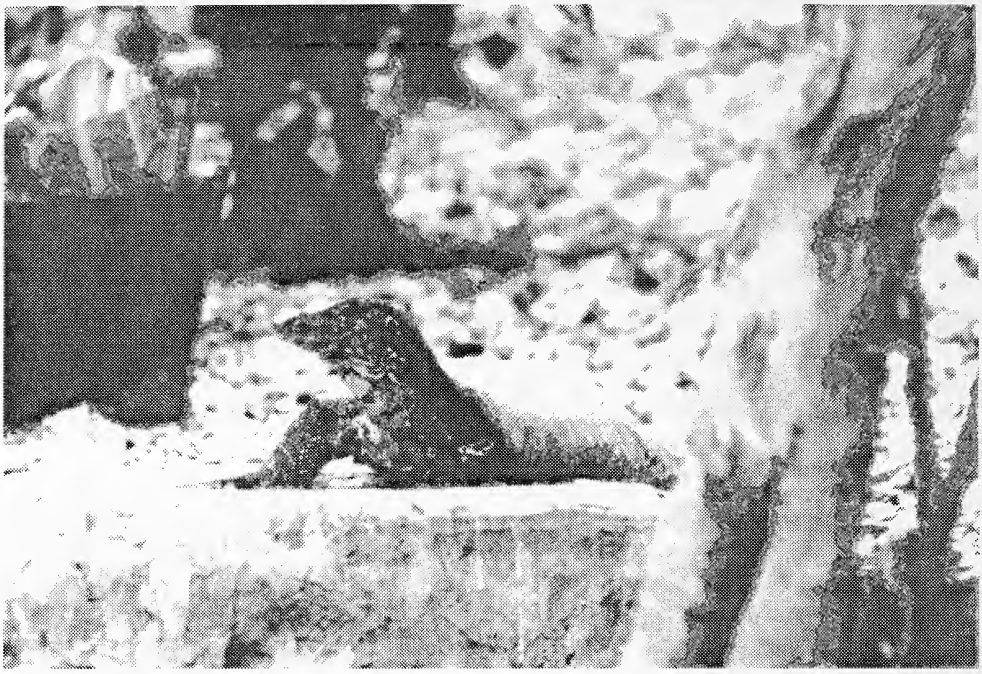
There are also large groups of Komodo dragons and estuarian crocodiles on exhibit. Much to my surprise, the major animal attraction of the park seems to be a polar bear that had been presented to Taman Safari by the Adelaide Zoo. The walk-through aviary had an excellent collection of rare Indonesian bird life such as great hornbill, green peafowl, crested fire-back pheasant, red lory, rainbow lorikeet, palm cockatoo, Victoria crowned pigeon, and lesser bird of paradise.

Taman Safari is a combination zoo, circus, and amusement park. Along with the animal acts and rides, there is also serious conservation work being done here. The safari is an important part of the Sumatran tiger and rhino Species Survival Plans.

There is also an aquarium, Sea World Lippo, and a crocodile park located within the city limits of Jakarta. I did not visit either. However, I was told that the Sea World facility is well run and educational, while the crocodile park is rather depressing.

I also visited three wildlife reserves that are located within a half day's drive of the city. The first was Pulau Dua, located west of Jakarta near Banten. We had a bit of trouble finding the reserve, as there are no signs for the park and most of the local people are unsure of its exact location. The best way to see Pulau Dua would be by an organized tour from Jakarta. The reserve is a major rookery for wading birds and it is also an important stop for migrant birds during the months of March and July. Even though I visited in October, I saw some interesting birds. These included little cormorants, grey heron, great egret, little egret, cattle egret, green imperial pigeon, collared kingfisher, pied fantail, and black-winged starling. The latter looks very much like a dark-winged version of the highly endangered Bali starling, minus the blue face; a sort of poor man's Rothschild's myna. I also got an excellent look and photo of a water monitor

from the windows of the park's office. The ranger informed us that the building is visited nightly by fishing cats. The best time of day to visit Pulau Dau is at dusk when the birds return to spend the night at their roosts.



Shown above is a water monitor *(Varanus salvator)* **in the Pulau Dua Reserve located west of Jakarta.** *(Photo by Robert Berghaier)*

Gede Pangrango National Park is located two hours southeast of Jakarta. The most accessible areas of the park, near the Cibodas entrance, are often crowded with Indonesian visitors on weekends and during most days between 9:00 a.m. and 4:00 p.m. I would recommend staying overnight close to the park entrance so as to arrive at dawn at the Cibodas Botanical Garden. The garden's open vistas make it an excellent birding site.

The morning I was there, I was very lucky and saw a group of black leaf monkeys, a pair of Javan grey leaf monkeys, and a black-striped squirrel. After leaving Cibodas, I walked along a crowded trail to the Cibeureum Waterfalls. I saw the following birds: Javan hawk-eagle, collared kingfisher, little pied flycatcher, rufus-tailed fantail, and what I believe was a Sunda blue robin. I was also told by my guide that a late afternoon visit to Cibodas or along the trails in the park produces some good birding opportunities. Gede Pangrango is large enough for more extensive overnight hiking. Leopards, gibbons, wild pigs, and barking and mouse deer are found within the reserve. All of which, except for the leopards, are frequently seen. Gede Pangrango appears to be well-patrolled and effectively managed.

The third reserve I visited was Rawa (Lake) Danau. This park is located half a day's drive west of Jakarta. To adequately see the reserve, an overnight stay on the coast or in the nearby town of Serang is necessary. My guide, Mr. Gatot,

had a difficult time finding the exact location of Rawa Danu. We eventually got within ten kilometers of the reserve by car and had to arrange for motor bikes to carry us up to its boundaries. Mr. Gatot arrived ahead of me and got a brief glimpse of a fishing cat which ran off quickly. This was a real pity since it would have been one of the highlights of my trip to have seen it myself. There are no trails into Rawa Danau, so the only way to explore the area is by boat. As a result, Mr. Gatot negotiated the rent of a local fisherman's boat and we were able to see a small part of the park.

The reserve is supposed to contain viable populations of both the black and grey leaf monkey. Our local escorts told us they often hear Javan gibbons in the morning. We did not see any of these, but I did spot a group of five long-tailed macaques. The bird life was very interesting, and we saw several that are difficult to find elsewhere in Java. They included lesser adjutant stork, black eagle, oriental darter, purple heron, three species of kingfishers: stork-billed, blue-earred, and white-throated, and rufus piculet. We also saw cattle egret, spotted dove, tree sparrow, and barn swallow which are birds more commonly found on the island.

While the previously visited reserve, Gede Pangrango, appeared to be well taken care of, it was obvious that Rawa Danau was not. While we were waiting for our boat, I observed a raft of freshly cut logs floating by. Throughout our visit, I heard chain saws and saw smoke from a fire in the protected forest that surrounded the lake. There were over a dozen men fishing along the reserve's waterways. It is reportedly illegal to log, start a fire, or fish in an Indonesian protected area. The local men told us that twelve rangers are stationed at Rawa Danau, but despite being in the reserve for four hours we never saw them. This area appears to be under very heavy encroachment pressures.

There are two other protected areas near Jakarta that I did not visit. Pulau Rambut is a bird and marine sanctuary located off shore from Jakarta, an hour away by boat. The best way to visit this reserve, according to Mr. Gatot, is to rent a boat and stay off the island overnight. At dawn the birds leave from their rookeries en mass for their daytime foraging areas.

Gunung (Mount) Halimun has recently been granted national park status. The reserve is located two hours south of Jakarta. I can personally attest to the poor condition of the roads leading into the area. They can only be traversed by land rover or jeep. There are no facilities in the park, so visitors must bring all provisions with them. A visit must be arranged from the park headquarters of the Cibodas station of Gede Pangrango. The reserve contains the best primary forest that remains in western Java and as a result is an extremely critical area for the long-term future of the Javan gibbon, endemic grey, and black leaf monkeys. The Wildlife Preservation Trust of Philadelphia has joined with several Indonesian conservation organizations to help manage this important park.

Chapter News Notes

Little Rock AAZK Chapter

In the history of this Chapter there has always been a small group of members who have shown great interest and dedication. As a result, there is the core of true "die hards" who have stuck with the Chapter through thick and thin. Over the years this Chapter has been involved in projects and events too numerous to mention. As keepers come and go, the "die hards" go on surviving the burn-out. The members work hard to keep it going and to stay involved. There are a great many talented people in this Chapter and it's a privilege to be a part of it.

As we arrive at yet another event (ChimpanZoo Conference, November 16-19, 1997) we are all excited about Dr. Jane Goodall coming to our zoo. This event is sponsored by the University of Arkansas at Little Rock, The Little Rock Zoo, and Friends of the Zoo. She will be speaking on Monday, 17 November at 7:00 p.m. at Robinson Auditorium, Tickets range from $10-$30 and are available by calling TicketMaster at Little Rock at (501) 374-2200. As always the Chapter will be on hand to help in any way. We know it will all be worth it and we hope to see some of you there.

—Marie Schmude Green, President

American Association of Zoo Keepers

Edmonton Chapter

Edmonton Chapter AAZK

Fall is in the air so it is time to recap a summer of changes, activities and fun. The Edmonton Chapter of the AAZK has undergone some officer changes. We are sadly lacking our President, David LaBelle, who has moved on to Moorpark, CA. We all wish him the best at the ETMA course and hope he will return to the frozen north when he is rich and famous. Our Board shuffling has added the needed combination of brawn, brains, creativity and polish to get through to our next election with flying colors. Our new Board officers are:

President.....Delia Gruninger
Vice President.....Frank Pucci
Treasurer.....Brenda McComb
Secretary.....Dina Riddick
Member 5.....Tara Edwards
Member 6.....Christene Clemens

During the spring we had an informative lecture from Const. Ken Chatel, R.C.M.P. on the "Illegal Trade

in Wildlife". In June we repeated our success of last year's Bowling for Rhinos with more great prizes, lots of fun and $1370.57 (Cnd) raised towards rhino conservation. We are now doing our final collection and tallying of recyclables collected over the summer months at the zoo. We will be channeling these funds toward some upcoming projects like the purchase of a Conservation Parking Meter, sponsoring the conservation of a national treasure, our Grizzly Bear, and increasing the level of education available to the visitors at our zoo. Cheers.

—Dina Riddick, Secretary

AAZK Welcomes New Chapters

AAZK, Inc. is pleased to welcome one brand new Chapter and one newly reorganized former Chapter to the Association.

The El Paso Del Norte Chapter is made up of members from the El Paso Zoo, 4001 E. Paisano St., El, Paso, TX 79905.

Officers for this new AAZK Chapter are:

President.....Amanda S. Leverett
Vice President....Jesus H. Arenas
Secretary.....Debra Nevarez
Treasurer/Liaison...Raquel E. Jimarez

Staff members at the Louisville Zoological Gardens, 1100 Trevilian Way, Louisville, KY 40233-7250, have rechartered the Louisville AAZK Chapter. The original Chapter was founded in 1971, but became inactive and closed in 1994. We are happy to see it up and running again!

Officers for the Louisville AAZK Chapter are:

President....Silvia Zirkelbach
Vice President/Liaison.....
Susan Craycroft
Secretary.....Lisa Trusty
Treasurer.....Jane Herndon

We wish both of these Chapters much success with their projects and plans for the future!

Recharter Packets Are Coming !

All AAZK Chapters are reminded that rechartering with the Association on an annual basis is a requirement of being an AAZK Chapter. Such rechartering allows Chapters to function under the nonprofit 501(c)(3) Group Exemption tax umbrella. Recharter Packets, which will include activity and financial report forms, will be mailed from Administrative Offices the first week in January 1998.

They will be due back in AAZK Administrative Offices **by 1 March 1998**. Chapters failing to return their recharter materials by this deadline will be assessed a late fee of $50.00 in addition to their regular recharter fee.

The Recharter Packets will be sent to the attention of the Chapter President. If you need assistance in filling out the forms or have questions about the recharter process, please feel free to contact Barbara Manspeaker at Administrative Offices in Topeka. Call at 1-800-242-4519 (U. S.) or 1-800-468-1966 (Canada).

Institutions wishing to advertise employment opportunities are asked to send pertinent data by the ***10th of each month*** *to: Opportunity Knocks/AKF, 635 S. W. Gage Blvd., Topeka, KS 66606-2066. Please include closing date for positions available and when setting these dates keep in mind that because of bulk-mail, most readers do not receive the AKF until the middle of the month or later. There is no charge for this service and fax listings of positions which become available close to deadline are accepted. Our fax is (785) 273-1980.*

BIRD KEEPERS/HOUSTON ZOO...(three positions) requires high school diploma or equivalent; minimum of one year experience in the care of a wide variety of exotic birds. Duties include feeding, cleaning, maintaining exhibits, medicating, record keeping. Salary: $9.55/hr, excellent benefits. Send letter/resumé to: Red Bayer, Houston Zoo, 1513 N. MacGregor, Houston, TX 77030.

AVICULTURE INTERN...Junior, Senior or graduate student with interests in avian management/zoo biology to work with our animal care staff. 10-12 weeks. Winter, spring and summer positions available. On-site housing provided. Send a resumé and three references to: Scott Barton, Curator, Tracy Aviary, 589 East 1300 South, Salt Lake City, UT 84105. **Positions open until filled.**

HOSPITAL ATTENDANT (KEEPER)...requires high school diploma and minimum two (2) years experience in a zoo (preferably with a diverse collection to include mammals, birds, reptiles, etc.). NOT a vet tech position, but will report to veterinarian as supervisor, and work with one other keeper to provide care for hospitalized and quarantined animals. Starting salary $19,800.00 annually with excellent benefits package. Send two (2) copies of resumé (include social security number), references, and proof of education to: Chriss Miller, Miami Metrozoo, 12400 SE 152 St., Miami, FL 33177 **by 25 November 1997**. Phone: (305) 253-5050 for more information.

KEEPER...excellent opportunity to work at Audubon Center for Research of Endangered Species & Freeport-McMoRan Audubon Species Survival Center. Must be highly motivated, team player with the ability to work on his/her own. Requires valid driver's license, reliable transportation and one year's paid experience working with birds and mammals. starting salary is $15,000.00 - $18,000.00 depending on experience and ability. **Position open until filled**. Send resumé to the ACRES/FMASSC, 14001 River Road, New Orleans, LA 70131. Attn: Jeff Vaccaro.

ZOO KEEPERS/Woodland Park Zoo...requires two (2) years' experience caring for zoo specimens in an accredited facility. Permanent full and part-time positions. Will assist with care of variety of animals, prepare special foods/diets, infant feedings, clean/disinfect animal and exhibit areas, administer medications, make/record observations, prepare reports, assist with movement of animals and animal training, give keeper talks and interact with public. Great ape and/or elephant experience highly desired. Salary $2,524.00/month. Send resumé and letter of interest **by 19 December 1997** to: S. Bergstrand, Seattle Personnel Department, 1219 Dexter Horton Building, Seattle, WA 98104-1793.

The following positions are available at the North Carolina Zoological Park. Send resumé and cover letter by date indicated for each position to: Human Resources, North Carolina Zoological Park, 4401 Zoo Parkway, Asheboro, NC 27203. Fax: (910) 879-2891.

ZOOKEEPER I & II...the North Carolina Zoological Park is accepting resumés from keepers for potential openings in the African Plains section of the zoo. For both positions experience with African hoofstock and storks/cranes is desired. A degree in a biological science, as well as experience at an accredited zoo are preferred. Starting salary is $17,523.00 (ZKI)/$18,958.00 (ZKII), increasing to $18,398.00 (ZKI)/$19,905.00 (ZKII) upon satisfactory completion of probation, plus benefits. Send resumé and cover letter **by 31 November 1997.**

ZOOKEEPER II/Sonora Desert Habitat...the North Carolina Zoological Park is accepting applications for a Sonora Desert Keeper II. Sonora Desert is a diverse natural habitat exhibit containing a variety of reptiles, birds, mammals and invertebrates. We are looking for an experienced bird keeper to help manage the bird collection under the direction of the area supervisor and Curatorial staff. A degree in biological science, as well as experience at an accredited zoo preferred. Starting salary is $18,958.00 increasing to $19,905.00 upon satisfactory completion of probation, plus benefits. Send resumé and cover letter **by 30 November 1997. Mark envelope Attn: Zookeeper II - Desert.**

The following two (2) positions are available at the Jacksonville Zoological Gardens. Send resumés to: Denise Ball, Human Resources, Jacksonville Zoological Gardens, 8605 Zoo Parkway, Jacksonville, FL 32218. Deadline is 15 December 1997.

ANIMAL ENCOUNTER TRAINER...requires one year of animal care experience in a zoo environment and a strong interest in educating the public using natural animal behavior. Basic knowledge of operant conditioning, good communication skills, and willingness to participate in a team management approach preferred. Will assist in presenting animal shows/encounters and be responsible for the care/conditioning of its animals. Entry level salary commensurate with experience, plus benefits.

ZOOKEEPER/BIRD DIVISION...requires a high school diploma. bachelor's degree in biology or related field preferred or a minimum of two (2) years' experience working with avian collections. Responsible for all aspects of daily animal husbandry, exhibit maintenance, observation/enrichment, and assisting with educational interactive programs. Salary starts at $16,600.00.

The following three (3) positions are available with the Zoological Society of San Diego. Requested materials noted for each position should be sent to: San Diego Zoo/Human Resources Office/Otto Center, P. O. Box 551, San Diego, CA 92112-0511. Deadlines are noted with each position. EOE

KEEPER (Mammals Dept.)...this position will be responsible for the day-to-day management of animals. Requires animal husbandry knowledge. A bachelor's degree or equivalent experience in biology or a scientifically related field from a recognized institution and/or one year working in an accredited zoological facility is preferred. This is a fully benefited 25-40 hr/wk position. Pay rate is $13.75 per hour. Submit a separate letter of intent, resumé and the names of three (3) references. Mark materials/envelope ATTN: MAM#163002. **Deadline is 25 November 1997.**

KEEPER (Avian Propagation Center)...this position requires aviculture experience. Knowledge of artificial incubation and hand-rearing of baby birds is desirable. Applicants

must be available to work any of the seven days of the week. This is a fully benefited position/40 hours per week. Pay rate is $13.75 per hour. Submit a separate letter of intent, resumé and names of three (3) references; or apply in person at the address given above. Applications are accepted M-F, 1:00 - 4:00 p.m. Mark materials/envelope ATTN: KPR#162104. **Deadline is 28 November 1997.**

TEAM AREA LEAD...the Team Area Lead will be responsible for all aspects of the management of mammals, birds, construction & maintenance, horticulture and sanitation. Requires elephant and marsupial husbandry and management experience. Working knowledge of "protected contact" management techniques with elephants. Supervisory, public relations and education activities experience is a must. An example would be a minimum of five (5) years working in an AZA accredited zoological facility. Bachelor's degree or equivalent experience in biology or a scientifically related field from a recognized institution is also preferred. Proven leadership ability, teamwork, organizational and communication skills, as well as direct experience with the management of a broad range of mammals required and bird experience is highly desirable. This is a fully benefited, 40 hr/wk position. Pay rate is $15.99 per hour. Submit a separate letter of intent, resumé and the names of three (3) references. Mark materials/envelope ATTN:TAL#163501. **Deadline is 28 November 1997.**

INTERNSHIP...The Kentucky Reptile Zoo, a nonprofit organization, is seeking a student intern for the 1998 spring, summer, and fall seasons. The zoo is an educational exhibit, reptile breeding and venom research facility located near Kentucky's Red River Gorge and Natural Bridge State Park. The intern will assist in the captive maintenance of the zoo's reptile collection, collect admissions to the exhibit, give interpretive talks and interact with the public, assist with educational outreach programs, and perform other duties as assigned. In addition, the intern will be responsible for the completion of at least one research project related to the field of herpetology. The intern will **not be involved** in the handling of any venomous reptiles. Desirable qualifications include a willingness to handle snakes and other reptiles on a daily basis, ability to communicate effectively with people, writing skills, orientation to details, and self-motivation. Students majoring in the biological or natural sciences are preferred. Former interns have arranged for academic credit with their colleges or universities. Benefits include experience with the most extensive and diverse collection of snakes in the area, housing, and $55/week to cover expenses. Personal transportation is recommended. Starting dates are flexible, but a minimum commitment of three (3) months covering SPRING (March-May), or SUMMER (June-August), or FALL (September-November) is required. To apply send a cover letter and resumé to: Jim Dykes, Internship Coordinator, Kentucky Reptile Zoo, 1275 Natural Bridge Road, Slade, KY 40376. **Deadlines for applications are:** SPRING - 1 December 1997; SUMMER - 1 March 1998; FALL - 1 June 1998.

CHIMPANZEE CAREGIVER...one full-time position. Requires two (2) years of college-level course work, two years experience in the care of exotic animals; OR an equivalent combination of experience which provides the required knowledge, skills and ability. Primate experience a plus. Assist in the responsibility for caring for approximately 80 chimpanzees (*Pan troglodytes*) in a breeding colony. Must be willing to make at least a two-year commitment. Excellent benefits. EOE. Applicant must have a negative TB skin test, negative hepatitis B surface antigen test, and evidence of a measles booster or natural disease prior to employment. Send letter of interest (with requested salary), resumé and three letters of reference to: Jo Fritz, Director, Primate Foundation of Arizona, P. O. Box 20027, Mesa, AZ 85277-0027. **Position open until filled.**

AAZK Membership Application

check here if renewal [ ]

Name _____

Address _____

City _____ **State/Province** _____ **Zip** _____

U.S. Members

☐ **$35.00 Professional**
Full-time Keepers

☐ **$30.00 Affiliate**
Other staff & volunteers

☐ **$30.00 Associate**
Those not connected with an animal facility

☐ **$60.00 or up** - *Individuals*
Contributing/U.S.

☐ **$100.00 or up**
Institutional/U.S.
Organizations/Institutions (requires Board approval)

☐ **International Members**
$50.00 International
All members outside U.S. & Canada regardless of category

Canadian Members

☐ **$40.00 Professional**
Full-time Keepers

☐ **$35.00 Affiliate**
Other staff & volunteers

☐ **$35.00 Associate**
Those not connected with an animal facility

☐ **$60 or up** - *Individuals*
Contributing/Canada

☐ **$100.00 or up**
Institutional/Canada
Organizations/Institutions (requires Board approval)

☐ **Library Only**
35.00 Library
Available only to public & university libraries

Zoo Affiliation (if any) _____

Zoo Address _____

Title _____

Work Area _____

☐ **My check is enclosed (AAZK, Inc.)** ☐ **Please charge my credit card**

MASTERCARD ___ **VISA** ___ **Card #** _____ - _____ - _____ - _____

Name on card _____ **Expiration date** _____

Signature _____

Mail this application to: AAZK Administrative Offices, Topeka Zoo, 635 S. W. Gage Blvd., Topeka, KS 66606-2066. Make checks/money orders payable to AAZK, Inc. Must be in U.S. FUNDS ONLY. Membership includes a subscription to *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada.

American Association of Zoo Keepers, Inc.
635 S.W. Gage Blvd.
Topeka, KS 66606-2066
U.S.A.

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ANIMAL KEEPERS' FORUM

The Journal of the American
Association of Zoo Keepers, Inc.
DECEMBER 1997

ANIMAL KEEPERS' FORUM, 635 S.W. Gage Blvd., Topeka, KS 66606-2066
Phone: 1-800-242-4519 (U.S.) 1-800-468-1966 (Canada) FAX (785) 273-1980

DECEMBER 1997
Vol. 24, No. 12

Managing Editor: Susan D. Chan • **Associate Editors/Enrichment Options Coordinators:** Kayla Grams, Arizona-Sonora Desert Museum & Gretchen Ziegler, Sequoia Park Zoo • **Book Review Coordinator:** Andrea Bernee, Chaffee Zoological Garden • **Legislative Outlook Column Coordinator:** Georgann B. Johnston, Sacramento, CA. • **ABC's Column Coordinator:** Diana Guerrero, San Diego, CA • **Reactions Column Coordinator:** William K. Baker, Jr., Lufkin, TX

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About the Cover.....

This month's cover features a Bald Eagle (Haliaetus leucocephalus) named Leah drawn by Scott Schiller, a keeper in the Bird Department at the Brookfield Zoo, Chicago, IL. Scott worked with Leah in the birds of prey demonstration at the zoo. Bald eagles live mostly near the ocean, rivers and lakes from Arctic Canada and Alaska to the Gulf of Mexico. The live primarily on fish which they use their strong talons to catch as they skim across the surface of the water. They tear their food apart with their powerful hooked peaks. They may have a wingspan up to 7 1/2 feet. Bald eagles build their nests high in a tree top and construct it of branches, twigs and dry grasses. They add to the nest each year until it may be well over four feet deep. Bald eagles mate for life and usually produce two chicks after an incubation period of 1-1 1/2 months. Thanks, Scott!

Information for Contributors

Animal Keepers' Forum publishes original papers and news items of interest to the animal keeping profession. Non-members are welcome to submit articles for consideration. Articles should be typed or hand-printed and double-spaced. Authors are encouraged to submit their manuscripts on a disk as well as in hard copy form. Acceptable formats include: for Macintosh users - Microsoft Word or Works; IBM users - Word for Windows, WordPerfect or Wordstar. All illustrations, graphs, charts and tables should be clearly marked, in final form and should fit in a page size **no greater than** 5.5" x 8.5" (14cm x 22cm). Literature used should be cited in the text (Brown, 1986) and alphabetically in the final bibliography. Avoid footnotes. Include scientific name (as per ISIS) the first time an animal name is used. Thereafter use common name. Use metric system for weights and measurements (standard equivalents may be noted in parenthesis). Use the continental dating system (day-month-year). Times should be listed as per the 24-hour clock (0800, 1630 hrs. etc.). Glossy finish black and white photos **only are accepted**. Color slides should be converted to black and white prints (minimum size 3" x 5" [8cm x 14cm]) before submission. Clearly marked captions should accompany photos. Please list photo credit on back of photo.

Articles sent to *Animal Keepers' Forum* will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for *AKF*. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed, appropriately-sized envelope. Telephone and FAX contributions of late-breaking news or last-minute insertions are accepted as space allows. However, long articles must be sent by U.S. mail. Phone 1-800-242-4519 (US); 1-800-468-1966 (Canada); FAX (785) 273-1980.

Deadline for each regular issue is the 10th of the preceding month.
Dedicated issues may have separate deadline dates
and will be noted by the editor.

Articles printed do not necessarily reflect the opinions of the *AKF* staff or the American Association of Zoo Keepers, Inc. Publication does not indicate endorsement by the Association.

Scoops & Scuttlebutt

Tree Kangaroo Husbandry Part I Videotape Now Available

A copy of the Tree Kangaroo SSP's (TK-SSP) keeper training videotape entitled "Tree Kangaroo Husbandry -Part One" was recently mailed to all TK-SSP institution representatives. This videotape is the first in a series being produced by the TK-SSP. This video covers the subjects of identification, housing, nutrition, health and shipping. The cover letter accompanying the videotape requested that it be viewed by everyone involved with the captive management of tree kangaroos. If you are involved with the management of tree kangaroos and **have not** yet seen this video, contact your TK-SP representative and ask to see it.

Part Two "Behavior and Reproduction" and Part Three "Joey Development" are currently in production. Until Part Two is completed, a "rough edit" on the subject of pouch checking is available for short-term loan.

If you wqould like to have your own copy of Part One, copies are available for a cost of $15.00. Please make checks payable to the TK-SSP Husbandry Videotape Project, and mail to the attentionof Judie Steenberg, Woodland Park Zoo, 5500 Ohinney Ave., North, Seattle, WA 98103.

Center for Ecosystem Survival Receives Disney Award

Walt Disney Attractions has presented a $10,000 Disney Wildlife Conservation Fund award to the Center for Ecosystem survival. The grant will support CES's Coral Reef Conservation Leadership Workshops. The Workshops were developed to enhance direct conservation action from stuidents, teachers and the public for the preservation of threatened and endangered coastal and marine ecosystems.

The Disney Fund was established to promote and enable global wildlife conservation through partnerships with scientists, educators and organizations committed to preserving the earth's biodiversity. For more information contact the Center for Ecosystem Survival, Department of Biology, San Francisco State University, 1600 Holloway Ave., San Francisco, CA 94132; (415) 338-3393/Fax (415) 338-2295, e-mail: gershenz@sfsu.edu.

Australian Zoo Official Dead at 51

Dr. John Kelly, the Director and Chief Executive Officer of the Zoological Parks Board of New South Wales died on 25 October at his home in Sydney. Dr. Kelly had been Chief Executive Officer of Taronga and Western Plains Zoos since October of 1987.

Dr. Kelly's commitment to the zoos' vital role in environmental education was

demonstrated by a wide-reaching program of redevlopment beginning with the opening of the famous Taronga Centre in 1987 and recent projects like the McDonald's Orangutan Rainforest, Western Lowland Gorilla breeding facility and Energy Australia's Taronga NightZoo. He also initiated projects designed to insure the future of wildlife. These included the Genome Storage Bank joint venture with Monash University in Melbourne and the Australian Marine Mammal Research Centre with the University of Sydney.

Taronga and Western Plains Zoos appearance changed dramatically during Dr. Kelly's tenure, presenting animals to visitors in ways that set international benchmarks in the display of wildlife. Displays incorporating demonstrations of animals' natural behaviors brought wildlife closer to people, encouraging understanding at new levels. The most recent was the Kodak Free Flight Bird Show in which birds from Taronga's collection demonstrated their natural abilities in free flight without aviaries or mesh.

Dr. Kelly had contracted cardiomyopathy in the early 1990s and undergone a heart-lung transplant in May of 1993. Despite ongoing treatment and periods of hospitalization for maintenance of his health, Dr. Kelly continued active development of the Taronga and Western Plains Zoos in the areas of exhibitry, research and conservation. He is survived by his wife and four children.

AAZK Zoo Keeper Grant in Research

The American Association of Zoo Keepers (AAZK) has developed the Zoo Keeper Grant in non-invasive research to promote and support keeper and aquarist efforts in behavioral research. The $750.00 research grant is for the benefit of North American zoological research efforts. The next deadline for applications is **1 March 1998**. AAZK members in good standing should direct their inquiries to: Farshid Mehrdadfar, Chair AAZK Research Grant Committee, Disney's Animal Kingdom, P. O. Box 10000, Lake Buena Vista, FL 32830-1000; e-mail: farshid@sprynrt.com

AKF Columnist Relocates

William "Bill" K. Baker, Jr., author of the *Reactions* column in *AKF*, and co-editor of the *AAZK Crisis Management Resource Notebook*, has completed his research sabbatical and taken a position as the managing Zoo Curator at the Frank Buck Zoo. He may now be contacted at: Frank Buck Zoo, Leonard Park, 1000 W. California, Gainesville, TX 76240; phone/(940) 668-4533. Questions or suggestions for topics in the *Reactions* column may still be directed to Bill through AAZK Administrative Offices, 635 S.W. Gage Blvd., Topeka, KS 66606-2066.

Message from the President

Greetings from The Lone Star State!

I am sorry for being a bit late on a letter to the membership. I am just awakening from the post-conference coma that is very common among AAZK Conference Chairpersons. Another AAZK Conference has been placed on the shelves in history. Christina Smith and I would like to thank everyone who attended and participated in making the conference a success. We would like to also thank the Houston Zoo staff and docents for showing the delegates the Texas version of southern hospitality.

Our organization has made some remarkable strides over the past year. Most importantly we are beginning to recover financially and are strong. We do have to continue being prudent in spending to support the membership needs. This year the membership approved the proposed Five-Year Long Range Plan that will give us direction into the year 2002. The Board of Directors set short-term goals as well to serve as milestones on the road towards AAZK's future..

AAZK and its members have been active in educational programs in 1997. The *Junior Keepers' Forum* has done considerably well this past year. Thank you to the many Chapters that made a financial commitment to the project. The *Junior Keepers' Forum* will begin publishing six issues a year in 1998.

The International Outreach Committee has been very active this year. Jeannette Beranger and her committee worked with the Mexican Zoo Association (AZCARM) and the Meso American FIG to develop a Keeper Training curriculum. A workshop was held in August at the Morelia Zoo in Morelia, Mexico. This project received great Chapter and institutional support. It was a great success and other regions want training workshops of their own. With good planing such partnership with related zoological organizations lead to success.

I wish to thank everyone for their support during my last two years as President, and hope that I will continue to have your support. We are building new relationships and taking a more prominent role among our peers in the zoological community. AAZK hopes to expand our combined efforts with AZA and other conservation organizations to insure success in programs both at home and abroad. AAZK is an organization of strong and dedicated individuals. We are committed to raising the standards of quality animal care in all aspects of the profession. We have a commitment to conservation and education, while continuing to provide the latest information on husbandry and enrichment available to the membership. Together we can accomplish anything. Remember this is your professional Association. What you do as an individual member can make a difference.

Happy Holidays.

Ric Urban
President, AAZK, Inc.

New & Renewing AAZK Professional, Institutional, and Contributing Members

New Professional Members

Kathy Clabeau, **Utica Zoo (NY)**; Susan DeFalco, **Seneca Park Zoo (NY)**; Leslie Downey and James Ronemus, **Trexler Game Preserve (PA)**; Amy E. Cutting, **The Philadelphia Zoo (PA)**; Carolyn Beverly, **Natural Bridge Zoo (VA)**; Laura Pizza, **Santa Fe Teaching Zoo (FL)**; Julianne Stidham and Christy Timbrook, **Akron Zoo (OH)**; Jeff Krenner, **Underwater World/Mall of America (MN)**; Kelsie Weaver, **Bozeman, MT**; Jessi Krebs, **Omaha's Henry Doorly Zoo (NE)**; Tara Malta, Carole Satterlee, and Steve Jensen, **Louisiana Purchase Zoo (LA)**; Gail Fox, **Critterland Zoological Park (TX)**; Kristine McCue, **Tracy Aviary (UT)**; Danyelle Jung, **Wildlife World Zoo (AZ)**; Robin Senecal, **San Diego Zoo (CA)**; Thomas Nakayama, Robert Flaherty and Lara Kirkendall, **Sacramento Zoo (CA)**; Stacey McCaffree, **Pt. Defiance Zoo & Aquarium (WA)**.

Renewing Institutional Members

Dickerson Park Zoo, Springfield, MO

Moody Gardens, Inc.,
Curatorial Dept., Galveston, TX

New Contributing Members

Lynn Johnson, Willow Street, PA

A. J. Higginbottom
HMS Zoo Diets, Inc., Buffton, IN

Renewing Contributing Members

William Hamilton, Volunteer
The Philadelphia Zoo
Philadelphia, PA

Steve H. Taylor, Director
Cleveland Metroparks Zoo
Cleveland, OH

John Tobias, Director, Miller Park Zoo, Bloomington, IL

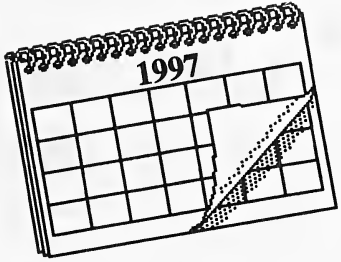
Need to Reach AAZK?

1-800-242-4519 (U. S.)
1-800-468-1966 (Canada)
FAX: (785) 273-1980
or write
AAZK, Inc.
635 S. W. Gage Blvd.
Topeka,KS 66606-2066
U. S. A.

Administrative Office Staff

Barbara Manspeaker - Administrative Secretary
Susan Chan - Managing Editor AKF
Orca - Office Cat
Office Hours: 9:00 a.m. - 3:00 p.m. CDT

Coming Events



The Second Biennial Zoos Committing to Conservation Conference - December 11-14, 1997 in Tampa, FL. Hosted by Busch Gardens. Topics to include program development, biodiversity issues, case reports, and the creation of a database from existing *in situ* programs. For further information contact: Beth Grayson at (813) 987-5548.

AZA Schools - February 2-7, 1998 at Oglebay Park,Wheeling,WV. Courses include: Professional Management Development for Zoo and Aquarium Personnel, Applied Zoo and Aquarium Biology, Conservation Education Training, Principles of Elephant Management, Studbook I, Population Management, and Institutional Records Keeping. For further information contact; AZA Office of Membership Services, Oglebay Park, Wheeling, WV 26003, (304) 2160.

Sixth Annual Conference of the International Association of Avian Trainers and Educators - February 6-9, 1998 in Minneapolis, MN. Hosted by the Minnesota Zoological Gardens. For information contact: Joanna Eckles, Bird Show Zoologist, Minnesota Zoological Gardens, 13000 Zoo Blvd., Apple Valley, MN 55124. Phone: (612) 431-9356; or fax (612) 431-9300.

11th Non-demestic Neonatal Symposium & Poster Session - March 3, 1998 in San Diego, CA. Hosted by the San Diego Wild Animal Park and San Diego Zoo. For more information contact: Karla Michelson, Veterinary Services Dept., San Diego Wild Animal Park, 15500 San Pasqual Valley Rd., Escondido, CA 92027; phone (760) 735-5530. For poster session info contact Debi Espinoza-Bylin at (760) 735-5530.

18th Biennial Pronghorn Workshop - March 23-27, 1998. Hosted by the Arizona Game and Fish Dept., in Prescott, AZ. For information contact: 18th Biennial Pronghorn Antelope Workshop, Richard A. Ockenfels, Chair, P. O. Box 41716, Phoenix, AZ 85080-1716; Phone: (602) 789-3379; Fax: (602) 789-3918; e-mail - rockcenfels@gf.state.az.us

Animal Berhavior Society Annual Meeting - July 18-22, 1998 at Carbondale, IL. To be held at South Illinois University, along with contributed talks and posters, the meetings will include symposia on 'Spiders in Behavioral Ecological Research' and invited papers on 'Proximate and Ultimate Causation of Behavior'. Plenary speakers include Sydney Gauthreaux, Jane Brockman, and Jeff Galef. For further information contact: Lee Drickamer, Dept. of Zoology, Southern Illinois University, Carbondale,IL 62901, (618) 536-2314, Drickman@zoology.siu.edu;http://loris.cisab.indiana.edu/animal_behavior.html

AZA Western Regional Conference - 11-14 March 1998 - Monterey, CA. For further information, contact Ginger Hopkins, Monterey Bay Aquarium, 886 Cannery Row, Monterey, CA 93940-1085 (408) 648-4925.

AZA Central Regional Conference - 1-4 April 1998 - Grand Rapids, MI. For further information, contact Brenda Stringer, John Ball Zoological Society, 1300 W. Fulton St., Grand Rapids, MI 49504-6100 (616) 336-4301.

AZA Eastern Regional Conference - 22-25 April 1998 - Boston, MA. For further information, contact Elizabeth Coleman, New England Aquarium, Central Wharf, Boston, MA 02110-3399 (617) 973-4925.

ABC's . . . .

Animal Behavior Concerns & Solutions

A Question and Answer Forum for the Zoo Professional

By Diana Guerrero, Independent Behavior Consultant,
Ark Animals of California, San Diego, CA

Gorilla *(Gorilla gorilla)* **Evaluation, Zoo**
Part Two

QUESTION
We would like to integrate our male silverbacks (*Gorilla gorilla gorilla*) into a bachelor grouping. What kind of input do you have regarding this?

BACKGROUND
Please see Animal Keepers' Forum, Volume 24, No. 11, 1997
As of the time this column was written, there are several bachelor groups in captivity across the USA. These groups include the following zoos: Birmingham, St. Louis, St. Paul, Zoo Atlanta, Cleveland, Memphis, Knoxville, Santa Barbara, Los Angeles, Walt Disney Animal Kingdom, and another is in process at Kansas City. Contacting these facilities and conducting a search for literature will assist you further in preparation to do this work.

OTHER NOTES
When evaluating any situation it is a good idea to consider other alternatives and motives. Back in 1990, Nicholas Gould, Editor for *International Zoo News*, voiced some of his concerns regarding discussions related to forming bachelor groups of gorillas. Cutting to the core issue — what do we do with the surplus of genetic material (male gorillas) created through captive breeding? Gould mentions four options: isolation, euthanasia, bachelor groups, and (perhaps someday) reintroduction.

Recently Gould raised the issue of "..making the best of a bad job." Whether or not you agree with him is not the point. As professionals it is our responsibility to be aware of all that we are doing and to be open to change. In many cases, we have had to correct some bad mistakes. This is especially true with primates, just look back at hand-rearing techniques and compare it to the current focus on responsive care and mother-rearing infants.

Private institutions have some good information to share and there are many good ones. Old attitudes of "us and them" that still surface, have no place in our consciousness, especially if we are working toward the same conservation and education goals. Working together to move our profession forward, and to motivate the general public to appreciate and take action will help make a

difference. These efforts are more critical than they have ever been.

Currently, acquisition of semen can be done through training and manual collection rather than electro-ejaculation. Many find this distasteful, but the world moves forward anyway. Now with success in insemination and in freezing techniques (of both sperm and eggs) there are more alternatives available. Are we using these methods to the best of our ability? Are we working with primatologists from other industries to accomplish success?

Recent work with an animal cryobank has alerted me to just how unique the science of reproduction is. As zoo professionals, it is going to be necessary to evolve in our management to accommodate those advances in science to enable us to manage those species in our care - especially when we begin looking at addressing sex ratio issues.

So, as the zoo industry and technologies move forward, the management of species may be best directed into socially correct groups, tighter restrictions of breeding and distribution, and a focus on what each facility wants to present as their specialty or theme. We also need to ask ourselves, if a facility cannot provide the space that an animal group needs, should it house them at all?

Understanding that every collection has their related struggles, my personal opinion is that we need to become specialists in managing collections of animals that have adequate space, and whose psychological, social, and physical needs are met. When considering all the needs to be met in forming a bachelor group, these items are of extreme importance. Quality collections with a specific focus is something I see as the wave of the future. When addressing special animal needs and groupings, it may indeed be making the best of a bad situation.

SUGGESTED READING

Gorilla Workshop Proceedings, the Gorilla Husbandry Manual, and Zoo Atlanta (standardized behavioral data collection) are other resources available to zoo personnel. Each of the papers listed below has excellent references related to this topic.

Gould, N.: (1990) Editorial. *International Zoo News*. 37 (5): 2-3.

Gould, N.: (1997) Editorial. *International Zoo News*. 44 (6): 326.

Harcourt, A. H. (1987): Behavior of wild gorillas and their management in captivity. *International Zoo Yearbook*. 26: 248-255

Harcourt, A.H. (1988): Bachelor groups of gorillas in captivity: The situation in the wild. *Dodo*, Journal of the Jersey Wildlife Preservation Trust 25:54-61.

Johnston-Scott, R. A. (1984): Integration and management of a group of lowland gorillas at the Jersey Wildlife Preservation Trust. *Dodo*, Journal of the Jersey Wildlife Preservation Trust 21:67-79.

Johnston-Scott, R. A. (1988): The potential for establishing bachelor groups of western lowland gorillas (*Gorilla g. gorilla*). *Dodo*, Journal of the Jersey Wildlife Preservation Trust 25:61-66.

Porton, I. and White, M. (1996): Managing an all-male group of gorillas: Eight years of experience at the St. Louis Zoological Park. Paper presented at the American Association of Zoo Keepers, Inc. Conference, Denver, CO.

Robbins, M. (1992): Social relationships among an all male group of mountain gorillas. Paper presented at the Gorilla Workshop, Milwaukee County Zoo. Milwaukee, WI.

Yamagiwa, J. (1987): Intra and inter-group interactions of an all-male group of Virunga mountain gorillas (*Gorilla gorilla beringei*). *Primates* 28:1-30.

ACKNOWLEDGMENTS

Thanks to all those who assisted me in this project. My special thanks to Richard Johnston-Scott, Reese Lind, Dan Wharton, Ken Gold, Ingrid Porton, Tara Stoinski, and Kristen Lukas.

Next Month: Common Training Errors 101/Moving Forward Before a Behavior is Stabilized

If you would like to submit a behavior question/scenario for discussion in this column, please use the guidelines published in the Aug. 1997 AKF (pg. 348-350). Requests for behavior evaluations should be sent to Diana Guerrero at Ark Animals, Inc., P. O. Box 1154, Escondido, CA 92033-1154 or directed to her e-mail address listed below.

About the Author: Since 1978 Diana has been active both in the U. S. and England working with zoos, private collections, an oceanarium, a marine aquarium, and other animal-related organizations involving captive wildlife. She has a broad base of animal experience involving movie & television training, zookeeping, show performances with live animals, education, behavior management, modification and enrichment, rescue and rehabilitation as well as captive breeding and management of endangered species. She is currently working as an Animal Behavior Consultant and Trainer with both exotic and domestic animals, she has authored numerous articles on animal behavior and training. If you have questions for Diana, you may contact her at 1-800-818-7387 or via the email listed below. ***NOTE:*** *The Ark Animals' Website has completed the change to Electronic Magazine Format. The "Ezine" features articles related to captive animal behavior, enrichment, conservation, and similar topics. The publisher welcomes electronically submitted articles (previously published or new work). Deadline is the 10th of the month previous to publishing. Interested parties may contact the publisher at arkabc@arkanimals.com Site address is http://www.arkanimals.com*

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The following papers are among those included in the Proceedings: A Cooperative Recovery Program for a Vanishing Species ~ How Old Was That Pregnant Elephant? ~ Management of a Rhinoceros Medical Problem Without Behavioral Conditioning ~ Coral Propagation and Exhibition at the Pittsburgh Aqua Zoo ~ Environmental Enrichment for Captive Raptors in Training ~ Penguin Water Interaction for Advanced Careers Camp at Sea World of Texas ~ Project Puffin - Seabird Conservation is an Attitude ~ Reintroduction of an Infant Southern Black Rhinoceros 68 Hours Past the Current Standard Limit ~ Bowling for Rhinos/A Visit to Lewa Downs ~ Okapi Husbandry at White Oaks Conservation Center ~ Bowling for Rhinos Conservation Areas ~ First Class Fostering: Bald Eagle Conservation at the Salisbury Zoological Park ~ Successful Reproduction in a Small Flock of Chilean Flamingos ~ The Weaning, Socialization and Reproductive History of Caribbean Flamingos at the San Antonio Zoo ~ Displacement Aggression in Captive Long-tailed Green Magpies ~ Introduction of Female Francois Langur to an Existing Group ~ Kansas City Zoo Semen Collection in the African Elephant ~ Routine Milk Collection from Crate Conditioned Bongo at the Denver Zoo ~ Protected Contact: Beyond Elephants ~ No More Knockdowns: Indian Rhino Footcare Without Anesthetic ~ Native Wildlife Veterinary Care at the North Carolina Zoological Park ~ Physical Therapy with a Female African Lion ~ Injection Training of a Female Lowland Gorilla ~ Introduction to the World Wide Web ~ Synthesis of Zoos and Aquariums ~ Whose Beach Is It? ~ Ecological Habitats on a Budget ~ Red Panda Husbandry Training ~ Early Socialization of Hand-Reared Neonates at San Diego Zoo ~ Our Time is Running Out to "Save the Colobus" ~ Exhibit Use and Social Behavior of Black & White Ruffed Lemurs in a Multi-Species Lemur Exhibit ~ Benefits of Urine Collection in Determining Cyclic Behavior and Reproductive Success in Owl Faced Monkeys ~ The Calming of Bison During Routine Handling.

These are the papers which had been submitted as of this month's press time. We also plan to include any other papers, workshop summaries and poster session abstracts that become available to us by our publication deadline.

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REACTIONS

A Question and Answer Forum for the Zoo Professional on Crisis Management

By Wiliams K. Baker, Jr., Zoo Curator
Frank Buck Zoo, Gainesville, TX

Question
What type of safety precautions should staff members take in advance of animal restraint situations?

Comments
Animal restraint situations can be stressful for both the animal managers and the animals. However, this can be avoided through advance planning and the development of safety procedures specific to animal restraint situations. Animal restraint situations fall into two classes: physical and chemical, and while each situation is different from the next, it is possible to construct a few basic guidelines.

Safety Precautions
1. Animal managers should plan the technical aspects of an animal restraint situation in advance. All staff members should be trained and clearly understand their individual roles. A secondary plan should also be prepared in case of problems.
2. The staff members directly involved with the restraint procedures should inspect the capture equipment prior to its use at the site and perform repairs if needed. Also, all equipment should be on site before starting the procedure.
3. Whenever possible animal(s) should be separated from the main group or herd for either physical or chemical restraint. This can be accomplished by using a shift in the nighthouse or a holdover adjacent to an exhibit.
4. Whenever possible animal(s) should be separated from a group or herd 24 hours in advance of a restraint situation. This gives an animal time to acclimate to its surroundings and reduces stress and capture myopathy.
5. In certain cases, consideration should be given to shifting a familiar "companion" animal with the animal that is to be restrained or sedated in order to reduce stress or "separation anxiety". The companion animal is then shifted out before restraint procedure is implemented.

Physical Restraint
1. Shields and control poles are recommended when working larger animals without chemical anesthesia. Leather gauntlets, nets, and eye protection should be a consideration when working with smaller animals. Also, pens, keys, and radios should be removed before working in direct contact with animals.
2. Directed visual barriers can be utilized to great effect to move animals towards holding areas or restraint devices.
3. Physical restraint chutes can be extremely effective for controlling larger terrestrial

mammals such as hoofstock. Animals should be conditioned to enter restraint devices in advance of use.
4. Special attention should be given to removing objects in the restraint area, and to public and staff foot traffic in the area to prevent animal stress and impact injuries.
5. When netting smaller animals it is possible to increase "netting success" by using one zoo keeper to flush an animal, while a second zoo keeper attempts to net the animal. This reduces animal stress by decreasing capture time.

Chemical Restraint
1. Always insure that the dart rifle is never pointed toward another staff member and that the antagonist is on hand for emergency situations. Personal protection gear such as gloves, goggles, or face shields are advised when prepping darts.
2. Always wear gloves when retrieving a dart that has been used in an animal sedation to avoid contamination and mark the strike zone so that it can be identified.
3. Always wear gloves when handling an animal that has been sedated. This will reduce possible chemical or zoonotic contamination.
4. Always wait until an animal is lateral to enter the animal containment area and avoid sharp noises, unnecessary movement, and minimize talking during the procedure. Avoid flash photography at all times.
5. When handling hoofstock, it is advisable to stay clear of the "strike zone" created by a lateral animal. Also, when dealing with ruminants, the animal should be placed in a sternal position to prevent aspiration. The use of a visual barrier such as a towel can reduce capture myopathy. Hoods can be effective for raptors and other small animals.

Conclusion

The capture and restraint of an animal need not be a traumatic experience. Through the use of planning and preparation the procedure can be accomplished with minimal difficulty. Also, it's important to plan for the animal husbandry needs of your particular section. Whenever the opportunity presents itself, staff members should always try to record pertinent data such as body weight, temperature, physical measurements, and draw blood for analysis. Once the procedure has been completed staff members should continue animal observations in the event of capture myopathy, "re-narc", or hierarchal fighting. Also, never, ever forget to positively identify your animal through the use of ear tags, tattoos, bands, or identifying features.

NEXT MONTH: What type of safety precautions should staff members take into consideration when renovating an animal exhibit or bringing a new exhibit on line?

If you would like to submit a question for this column or have comments on previously published material, please send them to: Reactions/AKF, 635 S. W. Gage Blvd., Topeka, KS 66606-2066.

(About the Author: Since 1985 Bill has been active in the fields of science, zoology and wildlife management. His education and expereince include a B. S. in wildlife management and post-graduate work in zoology; Lab and Museum Assistant; Shoot Team leader, ERT Member, and Senior Keeper and Large Mammal Keeper at various AZA facilities. His area of research is crisis management in zoological institutions, which draws upon practical experience and training as a Rescue Diver, Hunter Safety Instructor, NRA Firearms Instructor, and Red Cross CPR/First Aid Instructor.)

The Challenges of Caring for One of the World's Most Intelligent Birds

By Carol Fiore, Bird Keeper
Sedgwick County Zoo, Wichita, KS

The kea (*Nestor notabilis*) has been called many names including pest, clown, charmer, thief, and killer. The amount of information available about these New Zealand parrots is scarce and conflicting, and depending on the source, they are seen as likable comics or as dangerous pests. Sparks and Soper (1990), in their popular parrot book, refer to the kea as a vandal. One point is generally agreed upon; keas are incredibly intelligent and adaptable birds. They engage in elaborate play (Keller 1974, cited in Tebbich et al. 1996) and are very social creatures. The kea's status in the wild is not certain, but in 1991 the New Zealand Department of Conservation estimated about 5,000 existed in New Zealand's Southern Alps (Mathewson 1991). The challenges of caring for and preserving this unique bird pose special problems for zoos.


(photo by Ken Fluke)

To those who love the kea, he can be an endearing character. Investigating objects from cars to camping equipment to toilet paper, these ever curious birds examine everything. There have been numerous reports of keas destroying windshield wipers, car molding, antennas, and the like. Tourists are likely to tell you never to leave your vehicle unattended and never ever leave groceries inside. Diamond and Bond (1991) have suggested that the kea's intense curiosity is due to the harsh conditions under which they live. This investigative behavior allowed Tebbich, Taborsky, and Winkler (1996) to conduct studies into the social cooperation of captive keas.

At the Konrad Lorenz-Institute in Vienna, Tebbich et al. (1996) observed the behavior of captive keas with a mechanical device containing a food treat. The apparatus required one kea to operate a lever while only the kea (or keas) at the other end could receive the treat. The test showed that there is a dominance hierarchy among keas and that social manipulation does occur. Keas, because of their inquisitive nature, are very adept at operating and investigating objects.

Unfortunately the kea's intelligence and ability to adapt to changing conditions have also gotten it into serious trouble with humans and have given it a reputation as a killer.

As long ago as 1907 the kea was accused of killing sheep (Oliver 1955). The information has been scattered and perhaps a bit exaggerated. Certainly there have been isolated incidents of keas eating meat from dead sheep and attacking some, but there has been speculation that farmers and shepherds are only too willing to blame every death on a kea attack. The keas were never a real problem in the harsh climate of the Southern New Zealand Alps until shepherds started grazing their flocks in what had previously been kea territory, moving their herds farther and farther up the slopes. Perhaps a few keas learned that this was a potential food source and exploited it (not unlike how we as intelligent humans learn to exploit new situations). According to a source from Kanze (1992), New Zealand ornithologist Dick Jackson found no evidence of widespread sheep killing by keas, and neither did kea expert J.R. Jackson in a 30 year study (Mathewson 1991). Some farmers would like nothing more than to shoot the "pests," but the kea gained protection in 1986. Prior to that Mathewson (1991) reports that between 1860 and 1970 at least 150,000 of the birds were killed, some by putting fiberglass insulation out for them to eat. Fortunately for the keas, they have become quite popular with tourists in recent years, and this of course helps to foster a much more favorable environment for them.

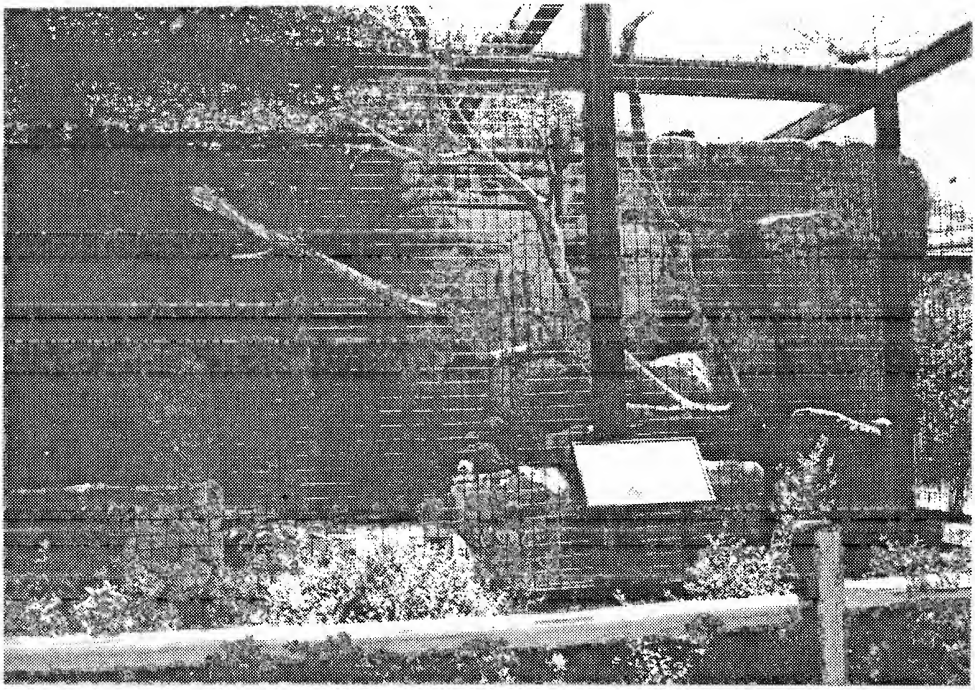
In March of 1997, the Sedgwick County Zoo (SCZ) in Wichita, Kansas acquired 1.2 keas from the Honolulu Zoo. After approximately four weeks of quarantine the older female was moved to an adjoining but separate cage next to the other two in the zoo's bird barn. The cages were laid with a laminated Formica® plastic flooring rather than having the typical wire bottoms of the other large parrot cages. The kea has very strong walking legs and our three frequently pace, so bumblefoot was a concern. Their pacing is best described as a run, hop, head twist, and swift turn. We do have some limited success in distracting them from this behavior through the use of various enrichments, mainly food treats. We sometimes give them empty grain sacks with plastic and ties removed, and they relish attention from keepers and visitors.

At the SCZ we feed our birds a mixture of dog chow soaked in a finely chopped psittacine fruit mix, hard-boiled eggs (peeled), celery, kale, parrot pellets, seeds, peanuts, apple biscuits, monkey biscuits, and fresh fruit (apples, bananas, oranges, melon, etc.) Our birds particularly love kiwis and we use it as an enrichment. We occasionally give them a small bit of bird of prey diet as a treat. Tebbich et al. (1996) comment on the keas attraction towards small balls of cooked yolk and margarine.

The new outdoor exhibit was recently completed, and the keas were moved in June of this year. We converted what was formally a tree kangaroo enclosure that is located in our free flight outback exhibit. Needless to say, the keas will not be free flight, but will be housed in an enclosure complete with a waterfall. The maintenance crew has been ever mindful of the lock-picking abilities of our

threesome in designing and building the exhibit. We do plan to leave the keas outside in the winter since they are naturally adapted to conditions even worse than our Kansas winters. The enclosure is unique and includes some unusual features.

The kea enclosure has three separate units; the largest front cage is 4.98m long by 2.74 m wide (16' 4" x 8' 11"). The two smaller units are in the back and will allow us to separate the three birds. Presently the older female is separated in one of the back units (it has a small pool). The larger front enclosure has a three-tiered waterfall which flows into a pool. There are three planters on various sides of the pool, and the artificial rockwork was designed to simulate the mountainous area in which the keas live in the wild. The rocks extend outside of the enclosure on both sides and give a more realistic appearance to the exhibit. Various holes have been punched into the rocks to encourage foraging behavior, and there are two nest boxes which are entered from crevices in the rocks (keas are ground nesters). There are a total of four enrichment tubes; one tube can deliver items directly into the water. Our keas make "soup" of practically everything they are given so a basket will be installed to prevent bits of food and other items from flowing directly into the main pool for the free-flight exhibit.



Recently completed outdoor Kea exhibit at Sedgwick County Zoo in Wichita, KS. *(Photo by Ken Fluke)*

Our keas look forward to seeing you at the SCZ, and we invite you to view them in their new home. No need to bring any lamb with you.

Acknowledgments

I would like to thank Bird Curator Jon Seltz for enduring my many questions and months of pestering about the arrival date of the keas, and a special thanks to Mick Hilleary and all the people at the SCZ who worked so hard on the kea project. Another big thanks to talented photographer Ken Fluke and to Education Curator Brad Batdorf for reviewing this article.

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Legislative Update

Compiled by Georgann Johnston
Legislative Advisor
Sacramento, CA
1-800-338-7348

Bog Turtles Receive ESA Protection

The U. S. Fish and Wildlife Service has decided to extend protection under the Endangered Species Act to bog turtles (*Clemmys muhlengergii*). Currently, the turtles are found from New York and Massachusetts down to Maryland and from Virginia to Georgia. The Service has documented less than 200 sites in the northern range where the turtles can be found and only 35 of those sites have the potential for maintaining the current population into the future without intervention to protect, maintain and restore the habitat.

Bog turtle populations have declined in part because they are very popular in both the national and international pet trade. The species is subject to trade restrictions under CITES but a spokesperson on behalf of the USFWS stated that a significant illegal trade in bog turtles exists. Likewise, suburban development has modified the species' wetland habitat, resulting in a reduction of their range.

Currently, most of the land supporting bog turtles is owned by private individuals and entities. The USFWS has stated that representatives from that federal agency, plus state wildlife agencies and conservation groups, will try to work with private landowners to preserve the remaining habitat. All of the 12 states in the turtle's range already provide varying levels of protection to the species under state laws.

Source: USFWS Press Release 4 November 1997

African Nations Fighting Rinderpest in Giraffe, Wildebeest, Other Ruminant Species

The Kenya Wildlife Service in conjunction with the Pan-African Rinderpest Campaign (PARC), is attempting to gain control over a serious and growing outbreak of the disease in the ungulates of Somalia, Kenya and Tanzania.

Since 1993, the Tsavo National Park in Kenya has lost 90 percent of its buffaloes to rinderpest and more than 50 percent of the park's giraffes, wildebeests, kudus, gazelles, and antelopes. Similar losses have occurred at Kenya's Meru National Park and the problem seems to be moving into Tanzania and possibly the Serengeti.

Veterinarians and epidemiologists studying the disease believe that it came from Somalia, most likely from infected domestic cattle. The disease can be eradicated in all ruminants via vaccination but nomadic cattle herders are mistrustful and suspicious of the vaccination program, believing that the government is "marking" their herds to later confiscate the animals. Education of the nomadic cattle herders as well as increased government funding for supplies and staff is the main goal of the current project.

Source: Natural History Magazine October 1997

Fund Established to Support Polar Bear Research

The U. S. Fish and Wildlife Service and the National Fish and Wildlife Foundation have established a fund to finance research regarding the conservation and management of polar bears in Alaska and Russia. The initial money in the fund will come from the $1,000 fee charged for a permit to import polar bear trophies from Canada under the 1994 amendments to the Marine Mammal Protection Act. The fund will be managed jointly by the Foundation and the Service's Alaska Region.

The USFWS reports that it "works with Federal, state, and international governments and organizations to coordinate measures for polar bear conservation, sustainable use, habitat protection, and to study Alaska-Chkotka (Russia) shared polar bear populations." These entitles include the U. S. Department of State, the Marine Mammal Commission, the U. S. Geological Survey, the State of Alaska, the Alaska Nanuuq Commission, the North Slope Burrough, and the Russian Federation.

The USFWS plans to use permit fees for other activities including the development of a "harvest monitoring management program" and possible surveys of bear populations.

Source: USFWS Press Release 17 October 1997

Peace Park Proposed to Protect Mountain Gorillas

Reuters reported 9/16 conservation groups propose the creation of a three-nation "peace park" for the Great Lakes area between Uganda, Rwanda and the Democratic Republic of the Congo. The 150 square-mile region is home to half the world's remaining 650 mountain gorillas. Human encroachment, armed conflict and the presence of refugee camps threaten the region. The International Gorilla Conservation Program said the park's creation would serve the double purpose of conservation and conflict resolution. The IGCP cited the impact of 700,000 refugees on the border of Parc National des Cirungas, which resulted in the destruction of 58 square miles of forest cover.

Source: GreenLines #470 10/2/97

Information Please

We would like to hear from any institutions housing African black-footed penguins that have had any problems with their chicks hatching with splay leg or other disabilities. Please contact: Audrey Adams, c/o Pueblo Zoo, 3455 Nuckolls Ave., Pueblo, CO 81005.

I have a question to pose for anyone who has a similar situation and problem that we are currently experiencing on the African Veldt section of the Fort Wayne Children's Zoo. We have a mixed-species exhibit of hoofstock and birds on our veldt. We also have a cheetah exhibit with only a fenceline between them and the veldt. No problems have occurred with this set-up until this year.

We introduced 2.0 sable antelope (*Hippotragus niger*) to our veldt this season and have since found our fenceline sliced through with a vertical motion! We would like to keep these magnificent animals on our veldt and also leave our cheetahs (*Acinonyx jubatus*) with 24-hour access to their exhibit. They have been kept out of this yard at night since no one is on grounds to observe an escape.

Anyone with ideas to help us resolve this issue, please respond to: Renee Vachon, Assistant Supervisor/African Veldt, Fort Wayne Children's Zoo, 3411 Sherman Blvd., Fort Wayne, IN 46808.

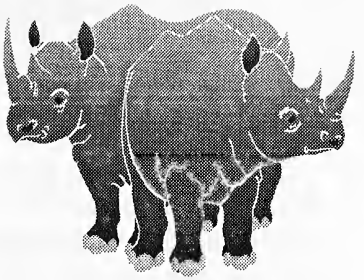
The Frank Buck Zoo is inthe process of developing a Zoo Keeper Training Program and is in need of reference materials on animal behavior, husbandry and management. If any individuals or institutions have materials they can donate, please send them to: Educational Resources, Frank Buck Zoo, Leonard Park, 1000 W. California, Gainesville, TX 76240.

Fetch. . .

The Seattle Times reports that a University of Washington biologist has trained a dog to sniff-out feces of endangered species. Biologist Sam Wasser re-trained a drug-sniffing dog to locate scat, which reveals information such as DNA on elusive endangered species.

"I'm always thinking about how you can get more poop out of the woods," Wasser said. "Then it hit me: dogs... [t]hey give you awesome sampling power. This could smoke everything else we're using. It could revolutionize field work." *--GREENlines Issue #343*

Bowling for Rhinos Update



submitted by Patty Pearthree
National BFR Coordinator

Please send in your 1997 event money ASAP so we can include your Chapter/organization in our 1997 totals. If you are waiting on a few stray checks, send what you have and then I can always add the rest later. If you have questions about "Bowling for Rhinos" please contact: Patty Pearthree, P. O. Box 199026, Indianapolis,IN 46219-9026, call (317) 322-8723 or e-mail ppear3@aazk.ind.net. You can also get info on the AAZK Web Page - http://aazk.ind.net

AAZK's Bowling for Rhinos (BFR) fundraiser has raised over $970,000.00 since 1990, entirely through volunteer efforts. One hundred percent of all funds go directly to three areas of conservation. The first is Lewa Wildlife Conservancy (LWC) in Kenya which has grown to 65,000 acres protected with a two meter tall electric fence that is home to 20 black and 33 white rhinos along with their ecosystems. Starting in 1994, AAZK expanded its funding efforts to include Ujung Kulon National Park in Java, Indonesia which is home to the last 47 Javan rhinos on earth (with a few recently discovered in Vietnam). AAZK again expanded its efforts in 1997 to include Bukit Barisan Selatan National Park in Sumatra, Indonesia where one of the largest populations of Sumatran rhinos now live. These efforts protect ecosystems enabling the protection of hundreds of endangered plants and animals.

1996 BFR Results

• **49** Chapters or institutions turned in money in **1996** with a total of **$149,250.00.** A total of $96,000 was sent to Lewa Wildlife Conservancy, $4,000 was retained for 1997expenses, and $49,250 was sent to Ujung Kulon in 1997 from the 1996 event.

• **46** Chapters or institutions have stated they are holding '97 events. As of 2 Nov. 1997, **39** have turned in their money with a total of **$121,671.00.** I estimate the total to be approximately $130,000 when all monies have been turned in.

BFR 1997 Top Individual Money Raisers
Thanks to everyone for the outstanding effort this year! Here are the Top Ten:

1. Janet Wiard, Oklahoma City Zoo (Oklahoma City, OK) **$6,256.00** - wins trip to Lewa Wildlife Conservancy in Kenya (most individual money raised in BFR history!)
2. Mary Wykstra-Ross, Hogle Zoo (Salt Lake City, UT) - **$5,240.00** - wins trip

to Lewa Wildlife Conservancy in Kenya.
3. Judyth Lessee, "Really Rhinos" - $2020.57
4. Jennifer Howard, Indianapolis Zoo (Indianapolis, IN) - $1,967.49
5. Lisa Fitzgerald, Dallas Zoo (Dallas, TX) - $1,530.00

6. Brad Hange, Greater Baltimore Chapter (Balitmore, MD) - $1,385.00
7. Betty Janner, Chinook Chapter (Calgary, AB, Canada) - $937.00
8. Patty Pearthree, Indianapolis Zoo (Indianapolis,IN) - $915.00
9. Linda Strass-Buruen, Lincoln Park Zoo (Chicago, IL) - $705.50
10. Paul Bermudez, Miami Metrozoo (Miami, FL) - $615.00

Top Money Raising AAZK Chapters

1. Dallas Zoo Chapter, Dallas, TX - $10,865.06
2. Chinook AAZK Chapter, Calgary Zoo - $9,535.69
3. Lincoln Park AAZK Chapter (Chicago, IL) - $8,500.00

Metro Washington Park Zoo (Portland AAZK Chapter) has raised the most since Bowling for Rhinos began with the total of $82,747.00!!

The Rio Grande AAZK Chapter would like to offer our BFR T-Shirts to all AAZK members. They are white with a black design and are available in Lg. and X-Lg. and sell for $12.50 each. If you are interested please call Rhonda Saiers at (505) 254-7833.

Blood Sampling in 0.2 Bornean Orangutans at the Kansas City Zoological Gardens

By
Beth A. Moore, Orangutan Keeper
and
Wm. Kirk Suedmeyer, DVM, Sr. Staff Veterinarian
Kansas City Zoological Gardens, Kansas City, MO

Introduction

In 1993, 0.1 Bornean orangutan (*Pongo pygmaeus pygmaeus*) at the Kansas City Zoological Gardens (KCZG) was determined to be hypothyroid. A conditioning process was developed to teach her to allow the veterinarians to routinely collect blood samples without anesthesia. The benefit of conditioning quickly became apparent and although we currently only draw blood on the two females, all four of our orangutans participate in conditioning sessions. This paper reviews the history and challenges of our blood-draw procedure.

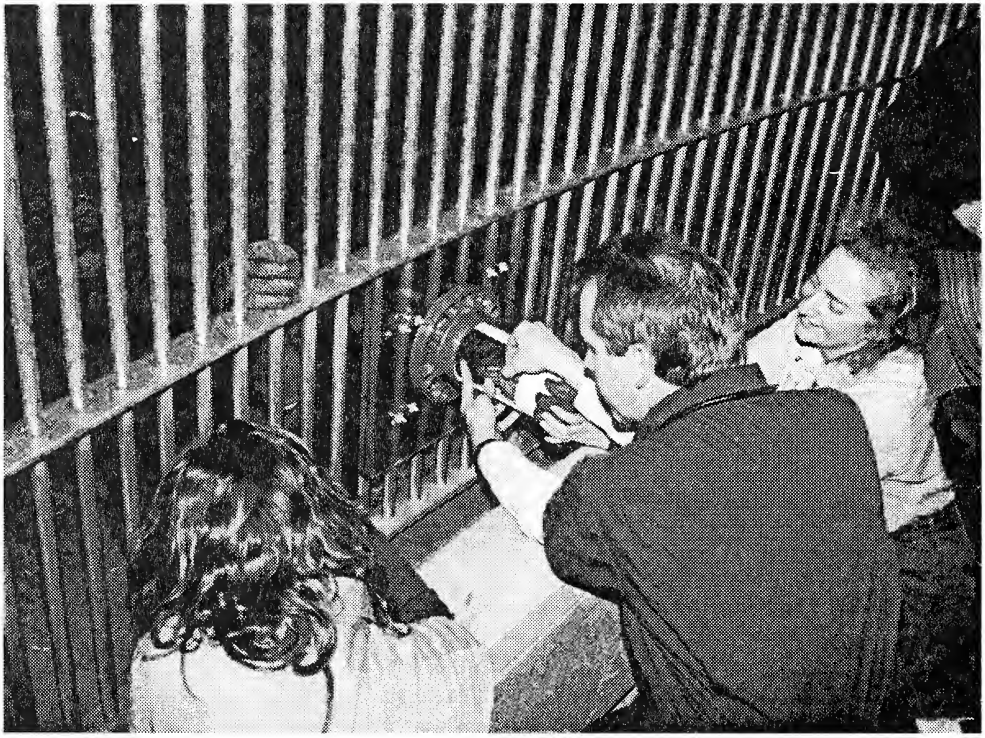
History/Methods

Training sessions began in November 1993 with 0.2 Bornean orangutans named Uracca and Jill. Uracca, a wild-caught orangutan was 29 years old when the training program was initiated. Jill was captive-born, mother-raised, and 17 years old. The animals were asked to perform simple behaviors such as touching a target, and hold and let-go commands. The target was a flashlight. At first the trainer would give a verbal command such as "touch", touch the flashlight to the animals' hand, and present a reward. The animals soon learned the verbal command and would touch the flashlight themselves upon hearing it. Diet soda, cheese, and grapes were used as rewards. Both the orangutans learned quickly and seemed to enjoy the extra attention. Sessions were held one to two times weekly for 10-15 minutes. The orangutans were not separated during these sessions.

Approximately one month later the blood sleeve was introduced. The sleeve was a 10.2cm (4") diameter PVC pipe fitted into a collar attached to the bars of a transfer chute. An area was cut out of the pipe to allow the veterinarian access to the back of the orangutan's hand and interdigital vein. A metal bolt was fitted through the end of the PVC that the animal was required to grasp. The target was placed at the end of the sleeve and the orangutans were asked to "target". This necessitated the animal reaching through the sleeve in order to target. A piece of cheese or a grape was placed on the target to encourage the orangutans the first few times. Both Uracca and Jill quickly caught on and were comfortable reaching into the sleeve without the reward on the target. Their hands were then manipulated around the bolt until they learned to grasp it. Finally they learned to immediately grasp and hold the bolt upon being asked to insert their arm into the sleeve. The veterinarians were not present at

this time. Training was discontinued in March 1994 due to several staff changes.

At the end of October 1995, more than a year later, the training program was renewed. Sessions were increased to twice daily for about 20 minutes, using juice as a reward. The juice was originally given from a squirt bottle but it was found that a bottle such as those used for ketchup worked better. Again the training began with asking the animals to target the flashlight and training progressed rapidly. By the beginning of December 1995 the blood sleeve was being used during training sessions. The decision was made to modify the sleeve by shortening it, placing it lower to the floor, and moving it to the sleeping stalls. As before, the animals were not separated during training sessions.



Veterinary and keeper staff conduct a blood draw on a 0.1 Bornean orangutan at the Kansas City Zoological Gardens. *(Photo: Janel Moeller)*

After a few days of reintroducing Jill and Uracca to the sleeve, the veterinarians began observing training sessions in order to desensitize the animals to their presence. The keepers also began pinching the animals to simulate a needle prick. The animals were then introduced to a capped needle, progressed to a blunted needle, and finally were poked lightly with an unaltered needle. Both Jill and Uracca were very tolerant of the needle and only a few sessions at each stage were necessary before the keepers could progress to the next type of needle. By the middle to the end of December, the veterinarians were able to apply a topical anesthetic and insert a needle during the training sessions.

Jill never withdrew when the veterinarians began attempting blood draws. She had previously offered her shoulder to a veterinarian for an injection so probably had some history of desensitization. Uracca initially retreated when pricked

with a needle by the veterinarian, but could be enticed back with heavy rewards in the same session. The veterinarians were successfully able to draw blood within two weeks on Uracca, and three weeks on Jill.

Current training sessions are held three times a week although it is not necessary to work with the blood sleeve more than once a week, and the veterinarians draw blood only about once a month. Jill and Uracca will both work for their usual juice reward, but special rewards such as yogurt are reserved for blood sampling sessions to ensure that it continues to be a positive experience. The veterinarians and technicians also take a few minutes at the end of each session to interact with the animals and give them treats. This ends the session on a positive note. In addition, to lessen distractions, the animals are now separated for their conditioning sessions.

Considerations and Difficulties

Safety Factors in Our Ape House

The Ape House where the orangutans are currently kept is an older building. The stalls have bars rather than a grid type mesh. This means the orangutans can easily reach out and grab a trainer. For this reason, it is our policy to always have another trainer on hand as a "spotter" during training sessions. This individual also records which behaviors are being worked during each session.

During blood sampling sessions the arm that is in the blood sleeve is lightly held in place by a trainer. Another trainer has the responsibility of rewarding the animal and watching the orangutan's other hand. This trainer alerts the rest of the staff to any movement that maybe interpreted as dangerous or aggressive. Any inappropriate movement by the animal results in the veterinarian withdrawing.

Interference from Other Animals

It often became a problem that one animal would become overly curious or jealous of the attention being paid to the other. Uracca, the dominant animal, would often interfere when the keepers were working with Jill. It was not always possible to separate the animals during a training session. Because of the design of the building it would have been necessary to lock one animal in with the adult male housed there. Both females were fearful of this situation and would not transfer easily. In order to keep Uracca busy, another keeper would feed her during Jill's conditioning session. However, having Uracca in close proximity would make Jill tense and "grabby". She would take the flashlight and attempt to dismantle it. The trainers switched to a piece of PVC pipe that was too wide to fit trough the cage bars. The target was given to Jill to play with through the bars for an afternoon. She quickly determined that it had no "value" and became bored with it, thus alleviating the grabbing behavior. Jill has since been moved to another area of the building to be housed with a different male. Because she can now be separated for conditioning, and is the dominant animal in the new area, she is no longer tense during conditioning sessions.

Modifications of the Blood Sleeve

The transfer chute in which the blood sleeve was originally located is the space used for the immobilizations and other medical procedures. The stress associated with this area made the orangutans reluctant to approach the sleeve. Thus the trainer had two situations to overcome at once. When training was renewed in October 1995, the blood sleeve was relocated to the sleeping stalls and now the orangutans regard it as another standard fixture. The sleeve was also placed lower to the floor to allow the orangutans to remain seated during the procedure. More recently the sleeve was modified again. The bolt was removed to allow the orangutans to reach further out to expose the superficial branches of the cephalic vein. The animals now simply grasp the end of the sleeve.

Staffing

Currently four to five staff members are required to accomplish a blood sample: one keeper to target the animal and position the arm; one keeper to continuously reward the animal during the procedure and watch for aggressive movement; a veterinarian to draw blood; a veterinary technician to process the blood sample during the procedure; and a person to hold and direct a supplementary light source during the procedure. This process is not likely to change in the near future and blood draws continue to be scheduled when there is enough staff on hand.

Male Orangutans

We are currently unable to draw blood on our adult male orangutan because his size prevents him from being able to fit his arm through the bars. Our sub-adult male is responding well to conditioning for this procedure, but it is apparent that he will soon be too large for the current set-up. We are exploring other locations in the building that might be used for these two animals.

Conclusions

The time and effort put into this program has been well rewarded. We are now able to easily monitor Uracca's hypothyroidism. Once the orangutans accepted the veterinarian it was an easy step to condition them to allow hand injections as well. The veterinarians are now able to carry out more thorough and stress-free evaluations of conditions that are not serious enough to warrant immobilization. We are also exploring the possibilities of conditioning our male orangutan to allow manual semen collections.

Acknowledgements

Thanks to past and present Orangutan staff: John Holcomb, Susan Averil, Doug Willis, Clay Simmons, Theresa Clark, and Jennifer Shillcox. Special thanks to Heidi Fisher and Penny Cramm for their assistance with this article. Also thanks to management at KCZG, especially Jerry Matthews, Zoo Area Supervisor, for continued support and encouragement of the orangutan conditioning program.

Cryptosporidium at the Infant Isolation Unit

By
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Infant Isolation Unit - Veterinary Services
San Diego Wild Animal Park, Escondido, CA

The spring of 1996 baby season was a busy one for the crew at the WAP Infant Isolation Unit. The seasonal influx of hoofstock neonates kept us at maximum capacity. A number of the neonates being hand-raised developed liquid stools. *Cryptosporidium* oocysts were isolated in fecal samples from four of the affected neonates. Three of the neonates with cryptosporidiosis recovered, but one with concurrent infections did not. A thorough cleaning and isolation regime has thus far prevented further cases.

Cryptosporidium

Cryptosporidium, a protozoal parasite, is the smallest coccidian oocyst measuring between 4-5*u*m in diameter. Cryptosporidiosis can infect a variety of animals including mammals, birds, fish and reptiles. Infections in immunocompetent individuals are usually subclinical or self-limiting (Stewart & Soll, 1994). Immunodeficient or immunocompromised individuals and neonates are most at risk for developing clinical infections (Stewart & Soll, 1994). An infection in the gastrointestinal tract causes: hypersecretion of fluids leading to dehydration and electrolyte loss, a nonspecific inflammatory response, malabsorption and maldigestion in the small intestine, malabsorption in the large intestine, resulting diarrhea (Cohen & Snowden, 1996). Infections can also affect the pancreas, liver, gallbladder, and respiratory system.

Cryptosporidia shed in the feces of infected animals are immediately infective (Cohen & Snowden, 1996). Infections have been reported in neonates as early as two days post-partum (Linklater & Smith,1993). The oocysts can be shed two to four days before the onset of diarrhea, and are shed intermittently once diarrhea develops and up to 19 weeks after its resolution. The shedding of oocysts appears to decrease with age.

Treatment

More than 100 agents have been tested for treatment of cryptosporidial infections, but none have proven convincingly effective. Infections in immunodeficient animals are not easily treated and there is a high mortality rate. Infected immunocompetent animals typically recover following supportive care including supplemental fluids and a clean environment. Preventive treatments such as feeding hyper-immune or pooled bovine colostrum or administering IV plasma have not been uniformly successful. In suspected cases, multiple fecal samples should be submitted for testing in case an infected animal is not actively shedding.

It is important to note that despite a positive test result, cryptosporidiosis might not be the primary disease process infecting an animal. In hand-raising situations diarrhea can be a result of simultaneously infections. A primary bacterial or viral infection could suppress the immune system of a previous immunocompetent animal predisposing it to a concurrent cryptosporidial infection. Alternatively, a primary cryptosporidial infection could predispose an animal to infection by other enteropathogens.

Our Cases at IIU

Four hand-raised neonates at the Infant Isolation Unit were diagnosed with cryptosporidiosis in May 1996 after an outbreak of diarrhea. Positive results of Bova-S

tests taken 24 hours post-partem indicated a good immune status. They all were good nursers with good weight gain and stools. In each case, loose stools followed a day or two of the animal being "off" - taking only partial bottles or being unusually fussy. The first animal, a northern gerenuk (*Litocranius walleri sclateri*) was nearly a month old when she developed loose stools. Two weeks later three additional animals, all between one and two weeks of age, exhibited the same symptoms: first a Central Chinese goral (*Nemorhaedus goral arnouxanus*); next a Turkomen markhor (*Capra falconeri heptneri*); and finally a Roosevelt's gazelle (*Gazella granti roosevelti*).

At the onset of the diarrhea each animal was offered Pedialyte® bottles offered for 24 hours to give the gut a rest, and then 50% Pedialyte®/50% formula for the following 24 hours. The gut rest and calorie deficit seemed to improve nursing. Pysllium or Kaopectate® was added to the bottles to help firm stools. Subcutaneous fluids were administered as necessary. An intermittent appetite and diarrhea continued for another week or two following the initial bout.

Treatments as prescribed by the veterinarians were also administered. Of the three animals that recovered, two were placed on the antibiotic Naxcel® while another was given a single dose of Butorphanol® (GI pain relief). The gerenuk received numerous treatments during the three weeks she was sick: Butorphanol®, Banamine® (analgesic effect), Pediatric Gentamicin (antibiotic), Tagamet® (stomach acid inhibitor), IV fluids, Claforan® and Humatin® (antibiotics). Her case was complicated by behavioral problems once she became sick. She began dirt-eating and responded poorly to being isolated. Necropsy results reported that in addition to sand in her reticulum and omasum, she had a smoldering omphalophlebitis (umbilical infection).

Prevention, Control & Cleaning

As there is no proven effective medical treatment prevention, timely identification and control of an outbreak are crucial. There can be up to ten million immediately infective oocysts shed in one gram of feces (Linklater & Smith, 1993). These oocysts are able to survive for months in moderate environmental conditions. They are resistant to many disinfectants, even with prolonged contact. They can be killed with steam, and prolonged exposure (18 hours in the study cited) to 10% formalin, 5% ammonia and undiluted bleach (Campbell *et al,* 1982). Rigorous cleaning, removal of contaminated bedding and fecal material, and uncontaminated food and water are all important to decrease the oocyst load in the environment. Isolation of infected animals is important to prevent further infections.

Our cleaning regime included bleaching and scrubbing stalls and replacing the dirt in outside yards followed by steam cleaning and bleaching. We also washed bottles and nipples used for infected animals in a separate bottle washing area. Two of our infected animals were isolated together, one was isolated singly, and one was isolated singly but given visual access to the group.

Zoonosis

Human keepers are vulnerable to infection since cryptosporidiosis is a zoonotic disease. In immunocompetent humans, infection is generally a self-limiting GI disturbance. In immunodeficient humans (which includes pregnant women) infection can develop into life-threatening diarrhea and invade other organs beside the intestine (Acha & Szyfrez, 1987). In order to decrease the human health risk keepers should wear protective clothing while working with infected animals. Masks should be worn during disinfection. Fecal samples being sent for screening should be clearly marked "suspected cyrptosporidosis".

Continued on page 556

The Nature of the Beast

By
Patricia M. Hainley, Zoo Keeper
Ellen Trout Zoo, Lufkin, TX and
William K. Baker, Jr., Zoologist, Lufkin, TX

Introduction

Webster' s defines zoology as "the biological science that deals with animals", but for those of us in the profession it means so much more. The field of zoology encompasses many different schools of thought, including animal management, human relations, and exhibit design. Zoology is not just a science, but rather a state of mind and a way of thinking. Personal experience has shown that it takes a certain type of individual to choose and survive a career in the zoological industry.

At times it seems as if zoologists should be classified as a separate species from the rest of the human race. As such, our language has developed into an independent method of communication. Many of the terms and phrases used by zoological professionals on a daily basis developed out of other fields of study and are often used in modified contexts and combinations. It has been our experience that there is no quick reference material available to the average zookeeper that effectively and completely lists such common terms and phrases. This is our effort to facilitate better communication among the professionals in our industry.

TERMS

AAZK - American Association of Zoo Keepers
AAZV - American Association of Zoo Veterinarians
Accreditation - the certification of an institution by the American Zoo and Aquarium Association (AZA)
ADT Form - Animal Data Transfer Form
AI - artificial insemination
Albinism - an inherited condition that results in total lack of pigmentation
Animal Keepers' Forum - the monthly journal of AAZK
Antagonistic Species - species that are incompatible in a captive environment
Anthropomorphism - to attribute human qualities and emotions to animals
Antivenin - an antidote for a venomous animal bite
APHIS - Animal and Plant Health Inspection Service
ARKS - Animal Records Keeping System
AWA - Animal Welfare Act (1970)
AZA - American Zoo and Aquarium Association (formerly AAZPA)
AZAD - Association of Zoo and Aquarium Docents
AZH - Association of Zoological Horticulture

AZMA - Aquarium and Zoo Maintenance Association
AZVT - Association of Zoo Veterinary Technicians
Bacteria - microorganisms that have the potential to cause disease
Behaviorism - the psychological study of behavior
Biome Exhibits - an animal exhibit that is based on a cross-section of a specific terrestrial or marine community
Breach of Containment - a situation in which an animal has bypassed the primary containment of an exhibit
Breeding - confirmed mating behavior
Breeding Loan - the temporary loan and transfer of an animal to another zoological institution for reproductive purposes
Browse - supplemental vegetation provided for enrichment or dietary purposes
Browser - an animal that eats vegetation above ground level
Cannibalism - a situation in which an animal feeds on others of its own kind
Capture Myopathy - the physiological response that occurs as a direct result of stress during the capture and restraint of an animal
Carnivore - a predatory, mostly flesh-eating animal
CAZPA -Canadian Association of Zoological Parks and Aquariums
Catch Pole - capture and restraint equipment consisting of a pole with an adjustable snare
CBSG -Captive Breeding Specialist Group
CDC - Centers for Disease Control
CITES - Convention on International Trade in Endangered Species of Wild Flora and Fauna (1973)
CMT - Crisis Management Team
Communiqué - the monthly newsletter of the AZA
Conservation - to maintain the environmental balance of a planet through the manipulation of natural resources
Containment - physical barriers that hold an animal in an exhibit
Contamination - to expose and infect species with a hazardous material or organism
Crisis Management Situation - a situation or event that occurs in or near a zoological institution that disrupts normal operations and poses a threat to the safety of the public, staff, or animal collection
Culture - the laboratory growth of microorganisms from a collected sample
Dart Gun - a firearm designed to deliver chemical darts
Dehydrated - a medical crisis due to lack of water
Disinfect - the removal of harmful microorganisms through cleaning
Docents - trained and certified zoological volunteers
Dx - a term for discontinuing medical treatment of an animal
Ecology - the scientific study of organisms and their relationships to the environment
Ecosystem - a natural unit of interacting living and nonliving parts
Ectoparasite - a parasite that lives on the surface of an animal
Ectotherm - an animal whose body temperature is dependent on environmental factors; cold-blooded
Elephant Hook - an elephant training tool used in free contact; also known as ankus

EMA - Elephant Managers Association
Endoparasite - a parasite that lives inside an animal
Endotherm - an animal whose body temperature is not dependent on environmental factors, but is internally regulated; warm-blooded
Enrichment - any variable introduced into an animal's environment that stimulates mental and/or physical activity
Entomology - the scientific study of insects
EPA - Environmental Protection Agency
ERT - Emergency Response Team
ESA - Endangered Species Act (1973)
Estrus - the period of time when a female animal is receptive to breeding
Ethology - the scientific study of animal behavior
Euthanasia - to humanely terminate an animal's life
Exhibit - an animal display area
Fecal Test - a laboratory test to detect internal parasites by examination of feces
Feral - a domestic or wild animal that is not part of a zoological collection
FIG - Fauna Interest Group (AZA)
Fight or Flight - a defense mechanism in which an animal will stay and fight or flee in a stressful situation
Free Contact - a type of training that uses negative targets and requires trainers to come into direct physical contact with the animals
Geographic Range - the area of natural distribution of an animal
Gestation Period - the time from conception to birth
Graphics - signage that provides information on animals and exhibits
Grazer - an animal that eats vegetation at ground level
Habitat - the natural home of an animal
Health Certificate - a certificate signed by a veterinarian insuring animal health prior to shipment
Herbivore - an animal that eats mostly plant material
Heredity - traits passed from generation to generation through genetic transmission
Herpetology - the scientific study of reptiles and amphibians
Hierarchy - the social order of an animal group
Histology - the scientific study of microscopic anatomy
Home Range - the area within which an animal spends the majority of its time
Horticulture - the science of cultivating plant life
Hot Snakes - venomous reptiles
Hyperthermia - a medical condition caused by above normal body temperature
Hypothermia - a medical condition caused by below normal body temperature
Ichthyology - the scientific study of fish
IM - a term for administering medications; intramuscular injection
IMATA - International Marine Animal Trainers Association
Imprinting - the process by which an animal develops a lasting attachment to a person or object
Inbreeding - the breeding of an animal with a genetically close relative
Infection - a medical condition caused by exposure to a disease producing agent

Ingest - the intake of a foreign object or compound
Insectivore - an animal that eats mostly insects
ISIS - International Species Information System
Jab Stick - a pole mounted chemical delivery device
Knock-Down - a sedation
Life Expectancy - the average length of life for a given species
Life Span - the longest lives example of a species
Limited Contact - a system of training that uses elements from both Free Contact and Protected Contact
Mammalogy - the scientific study of mammals
MEDARKS - Medical Animal Records Keeping System
Melanism - a genetic aberration resulting in excessive accumulation of dark brown or black pigments in an animal's skin and tissues
Metabolic Rate - the rate at which an animal turns food into energy
MMPA - Marine Mammal Protection Act (1972)
Molting - the natural process by which an animal sheds and replaces its outer covering
Mortality - the rate of death for a specific species or population
Musth - the period of time when a male elephant is ready to breed
Mutation - a genetic deviation which can be transmitted to offspring
MVP - minimum viable population
Natural Selection - the process nature uses to select animals with favorable traits for survival, resulting in the production of new types and species through successive generations
Necropsy - an autopsy on an animal
Necrotic - dead tissue
Neonate - a newborn animal
Neurotic Behavior - self-destructive behavior(s) exhibited by an animal in captivity
NPO - a medical term; nothing by mouth
OJI - On the Job Injury
Omnivore - an animal that eats plant and animal material
Operant Conditioning - a method of modifying behavior using positive reinforcement
Ornithology - the scientific study of birds
Outbreeding - the breeding of unrelated animals to increase genetic diversity
Pathogen - a disease causing organism
Paturation - birth
Perimeter - the outer barrier or fence line that surrounds a zoological institution
PO - a term for administering medication; by mouth
Primary Signs of Aggression - an animal's innate use of verbal and non-verbal cues to communicate a highly agitated state; species specific
Props - interactive physical structures placed in an animal exhibit
Protected Contact - a system of training using positive reinforcement in which trainers work animals from behind protective barriers
Put-Down - to euthanize
QID - a term for administering medication; four times a day
QOD - a term for administering medication; every other day

Quarantine - the period of isolation that occurs before an animal is allowed to interact with the current collection
Regional Exhibit - an animal exhibit that is based on a cross-section of a specific geographic region
Reinforcement - a way of manipulating the frequency of an animal's behavior
Restraint - the immobilization of an animal by physical and/or chemical means
SAG - Scientific Advisory Group (AZA)
Sedate - to chemically immobilize an animal
Septic - a medical crisis due to severe infection and/or shock
SID - a term for administering medications; once a day
SPARKS - Single Population Analysis and Record Keeping System
Squeeze - an animal restraint structure in which the walls of the cage move inward to physically immobilize an animal
SSP - Species Survival Plan (AZA)
Stereotypic Behavior - frequently repeated behavior(s) by an animal in captivity due to boredom or stress
Stress - an animal's physiological response to a situation
Studbook - a compilation of past and present members of a specific animal species
Sub-Q - a term for administering medication; subcutaneous injection
Substrate - the material covering the floor of an animal exhibit
Systemic Infection - an infection that has spread through the circulatory system an animal
TAG - Taxon Advisory Group (AZA)
Target - a point of reference used in training
Territoriality - defensive behavior exhibited over an inhabited area by an individual, mated pair, or group of animals
Thermoregulation - the maintenance of a constant body temperature regardless of environmental conditions
TID - a term for administering medication; three times a day
Transponder - a method of animal identification in which a computer chip is inserted under the skin of an animal
Trauma - a sudden physical injury or psychological shock
Tx - a term for denoting medical treatment of an animal
USDA - United States Department of Agriculture
USDI - United States Department of the Interior
USFWS - United States Fish and Wildlife Service
Vaccination - administering medication to an animal wit the intent of preventing disease
Vaccine - the specific medication administered in a vaccination
Vector - an organism that transports a pathogen
Virus - any of a variety of submicroscopic pathogens that can cause disease
WCMC - Wildlife Conservation and Management Committee (AZA)
Zoology - the study of animal sciences
Zoological Institution - a facility that maintains a collection of animals for the purpose of conservation, education, and exhibition
Zoological Society - a financial support organization associated with a specific zoological institution
Zoonotic - a disease that can be transmitted between humans and animals

Conclusion

This is not meant to be a complete or official list of zoological terms, but rather an easy reference or quick reminder of those terms and phrases used daily by zoologists. It is a given that some of these terms may or may not apply at every zoo, and that each institution will develop its own facility-specific terminology. However, by compiling this information and presenting it in a keeper-friendly form, we have attempted to give something tangible back to the industry that has given us so much!

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Currently Available Videotapes

NEW! Now available from the Zoo Nutrition Center: training tape modules covering Basic Nutrition and Commissary Management. Basic Nutrition (5 units) covers water, energy, carbohydrates, proteins, fats, vitamins and minerals. Commissary Management (2 units) covers topics such as food safety, building layout, equipment, pest control, etc. Each tape has a 15-20 minute run-time and can easily be incorporated into short meetings. Basic Nutrition - $200.00; Commissary Management - $100.00 or get both modules for $250.00. For more information, contact Dr. Wendy Graffam, ZNC, Wildlife Conservation Society, 185th and Southern Blvd., Bronx, NY 10460; (718) 220-5891; e-mail: wgraffam@wcs.org

RHINO TAPE - This 19-minute video chronicles the operant conditioning training techniques used with rhino at the Rolling Hills Refuge in Salina, KS. Training program allowed animal care staff and veterinary staff to work with these rhinos for medical procedures/daily husbandry protocols without use of anesthesia. This video demonstrates the training techniques used. Copies of this video are available for $12.00 by sending your request to: Steven C. Kaup at Sunset Zoological Park, 2333 Oak St., Manhattan, KS 66502. Please make checks/money orders payable to: Sunset Zoological Park Education Fund/Rhino Training Tape.

Chapter News Notes

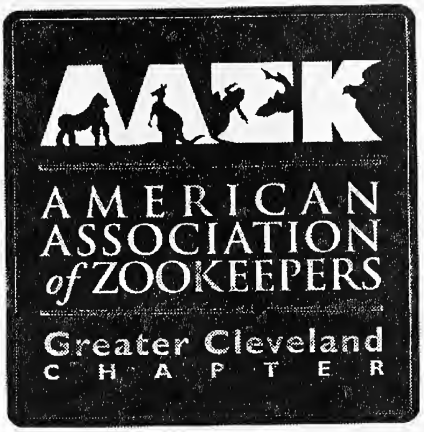
Cleveland Chapter

This year has been busy for our Chapter. In March we held our Second Annual Reverse Raffle. We hosted about 200 people who enjoyed a pig roast and reverse raffle. This event raised $3,000.00 for the International Snow Leopard Trust. In mid-April we held our Bowling for Rhinos raising an additional $3,000.00.

For Easter we sold ostrich eggs. We put a small ad in the zoo's membership publication, selling eggs for $25.00 each. The response was overwhelming! We sold 30 eggs and have had to establish a waiting list! The eggs are selling as fast as the birds are laying them. Special thanks to Nick Zarlinga, aquatics keeper, for fiberglassing the eggs. All the proceeds will be divided between the Lake Erie Science & Nature Center and the Ohio Department of Natural Resources Endangered Species fund.

Our Chapter has purchased a complete series of Zoo Books in Spanish to be donated to our zoo's sister zoo in Meridia, Venezuela. The books will be some of the first materials for the Meridia Zoo's emerging education program. During our June meeting we voted to donate $250.00 for sun bear education and $500.00 to a local raptor rehabilitation center for the construction of a new flight cage.

We soon hope to install our "homemade" coin drop in front of our rhino exhibit. Cleveland's public transportation donated an old fair box and our maintenance department gave it an African look. Graphics will soon be in place, explaining the plight of the rhinos in the wild. We will donate all monies collected to rhino conservation programs.



Our Fall event was the Boo Cemetery. This educational event takes place at our zoo's week-long "Boo at the Zoo". We have made an endangered species cemetery, highlighting the endangered species in our collection. AAZK members staff the cemetery and provide the public with information on conservation.

Following "Boo" we began preparations for our annual pictures with Santa which takes place during the zoo's month-long "Holiday of Lights Festival". This event is very time-consuming, but is a big money maker and is great public relations for our Chapter.

On a personal note, our Chapter has lost two valued members, Jim Naelitz and Tracy Sorenson who have taken positions at Disney's Animal Kingdom. We wish them luck in their new endeavors. They will be greatly missed!

—Cleveland AAZK Chapter

Western New York Chapter

The Western New York Chapter of AAZK was pleased to co-host a presentation by Andy Lodge, coordinator of the Ngare Sergoi Support Group, with Niagara County Community College and the Buffalo Zoo Docents.

Andy spoke at three different facilities to over 150 people bringing them up to date on the rhino reserve and the people in Kenya who work there. A silent auction with lots of interesting items rounded out the evening and resulted in $800.00 being raised to further conservation at the African preserve.

—Western New York AAZK

Roger Williams Park Zoo AAZK

The Roger Williams Park Zoo AAZK Chapter recently donated funds to conservation projects in this country and overseas. A contribution of $400.00 went to the Black-Footed Ferret Recovery Program. This program is involved in population management and reintroduction of the black-footed ferret in Wyoming and in neighboring states.

A contribution of $400.00 went to the Tree Kangaroo *In-situ* Conservation project. This project will study population status, work with the local population on land management, and train conservation biologists in Papua, New Guinea.

Our AAZK Chapter has donated an additional $200.00 towards the production of tree kangaroo notecards. The proceeds from the sale of these cards go to Tree Kangaroo SSP *Ex-Situ* projects. These projects include the development of an updated Tree Kangaroo Husbandry Manual, and the continued research into testing and treatment of avian TB.

They make the Perfect Pouch Stuffer! A pack of four notecards includes photos of Matschie's, Doria's and Goodfellow's tree kangaroos. To order cards, contact Adrienne Miller, Roger Williams Park Zoo, Elmwood Ave., Providence, RI 02905 or call (401) 785-3510, Ext. 310.

—Jonathan Shine, Chapter Liaison

Burnet Park Zoo AZK Chapter

Our Chapter has been busy this year. The activities of this Chapter have included sponsoring a keeper to the Enrichment Conference; sponsoring a speaker from Defenders of Wildlife for a presentation on wolves; providing lunches for in-house workshops; a successful Bowling for Rhinos event; selling cider during the Zoo's Zoo Boo at Halloween; and selling hot chocolate and gingerbread cookies during the Zoo's Christmas program known as Celebration at the Zoo. Our chapter has also donated funds to the World Wildlife Fund and supplies film for the Zoo's video camera.

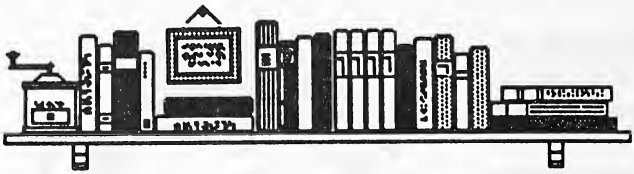
---Bernie Feldman, Chapter Liaison

Recharter Packets Are Coming !

All AAZK Chapters are reminded that rechartering with the Association on an annual basis is a requirement of being an AAZK Chapter. Such rechartering allows Chapters to function under the nonprofit 501(c)(3) Group Exemption tax umbrella. Recharter Packets, which will include activity and financial report forms, will be mailed from Administrative Offices the first week in January 1998.

They will be due back in AAZK Administrative Offices **by 1 March 1998**. Chapters failing to return their recharter materials by this deadline will be assessed a late fee of $50.00 in addition to their regular recharter fee.

The Recharter Packets will be sent to the attention of the Chapter President. If you need assistance in filling out the forms or have questions about the recharter process, please feel free to contact Barbara Manspeaker at Administrative Offices in Topeka. Call at 1-800-242-4519 (U. S.) or 1-800-468-1966 (Canada).



Book Review

SOFTBILLS - Care, Breeding and Conservation
by Martin Vince
Hancock House Publishers
1431 Harrison Avenue, Blaine WA 98230-5005
Softcover, 278 pgs.. Price: $24.95

Review by Michael Davis, Animal Keeper
Miller Park Zoo, Bloomington, IL

SOFTBILLS - Care, Breeding, and Conservation is a comprehensive guide to the care and breeding of softbills. I would highly recommend this book for beginning avian keepers and private collectors. It would also be a good reference book for the experienced person because of the detail with which he covers softbill care. There are 45 pages of color pictures to help illustrate equipment, ideas, and birds.

The first five chapters covers the various aspects of acquiring a bird, from the differences between captive-bred and wild-caught birds to types of aviaries in which to handle them. This section includes an acclimation schedule and a list of plants considered safe or not safe for use in aviaries. Chapters six and seven deal with the wide variety of dietary needs which softbills need. There are several different diets suggested and a detailed description of many minerals and vitamins are included here. The next three chapters cover breeding, incubation, and record keeping ideas and suggestions. The remainder of the first half is devoted to bird ailments. In this twenty pages the author lists symptoms, probable causes, and treatments for many bird problems. The second portion of the book is devoted to the color pictures and a section for each family of birds in the softbill category.

I found the book very easy to read and will consider it a valuable part of my collection. The wide variety of suggestions and ideas all come from the author's years of experience and are such that I think anyone who reads it will find at least one or two things they can use. The addresses for different items or products which the author uses would also be useful to any one setting up an aviary.

The Last Stand: The War Between Wall Street and Main Street Over California's Ancient Redwoods
by David Harris. 1996
Sierra Club Books, 85 Second Street, San Francisco, CA 94105
(374 pp., paperback)

Review by Jorie Moran
(former Senior Keeper at
Brookfield Zoo, Illinois)

Although Wall Street, junk bonds, and corporate takeovers in the 1980s are subjects that may not hold the interest of many readers, especially zookeepers, The Last Stand turns these topics into a horrifying and fascinating account of the effects of corporate lust on the environment. David Harris, the author, gives new and meaningful life to the much publicized events of the northwest's lumber harvesting industry. The Last Stand is based on interviews with the main characters, meeting notes, and legal documents. Far from being a dry archival account, Harris paints colorful pictures of flannel shirted loggers fighting for their jobs and heritage, dred-locked hippies protesting logging, and greedy tycoons of Wall Street destroying remaining virgin stands of California redwoods.

The story is even more intriguing, drawing in readers, because it is the story of a small family-owned lumber company committed to sustainable harvest. For generations, the Pacific Lumber Company had logged responsibly to insure income and employment for future generations. Texan Charles Hurwitz's hostile takeover of Pacific Lumber and subsequent increase in logging destroyed that security. It created a three way war between loggers, environmental activists, and Hurwitz's corporation. A car bomb, threats of spiked trees, and death threats make it a serious and potentially dangerous battle.

The troops include great grandsons of the honorable Mr. Murphy who founded Pacific Lumber, far out *Earth First!* members who stage sit-ins while dressed like Tarzan, Australian John Campbell who turned on the company which treated him like family, Mr. Murphy's naive widow, slick haired lawyers in expensive suits, a dedicated lawyer in cowboy boots, and family loggers who want to realize the American dream.

Although The Last Stand does not describe flora and fauna of redwood forest, it does describe the role of California Department of Forestry and the proceedings that are enacted to protect species of the redwoods. It piques the readers' interests in financial proceedings in large brokerage firms. It elicits anger at corporate greed and astonishment that corporations find legal loopholes. It creates empathy for loggers. Harris' novel achieves and important goal in telling a story largely unheard by the public. It is important reading for policy makers and environmental studies students. In truth it would bore no one.

Because The Last Stand is well written, it is easy and fascinating reading. The inside interviews with key players give it validity; however, the failure to capitalize the "s" in the genus *Sequioa* is distracting. Harris objectively covers the hostile takeover of an economically and ecologically responsible company and epitomizes the American tragedy of conflict between the environment and a big business. The fact that The Last Stand is non-fiction make it a compelling story. Because Hurwitz and the Pacific Lumber Company continue to appear in the news. The reader anticipates a sequel detailing who will win the war. Excepting the anger it creates toward environmentally irresponsible corporations, The Last Stand is a pleasure to read.

*Institutions wishing to advertise employment opportunities are asked to send pertinent data by the **10th of each month** to: Opportunity Knocks/AKF, 635 S. W. Gage Blvd., Topeka, KS 66606-2066. Please include closing date for positions available and when setting these dates keep in mind that because of bulk-mail, most readers do not receive the AKF until the middle of the month or later. There is no charge for this service and fax listings of positions which become available close to deadline are accepted. Our fax is (785) 273-1980.*

ZOOKEEPER (Hoofstock/Pachyderms)...Reid Park Zoo. Requires high school diploma and one year paid experience in the management of exotic hoofstock/ pachyderms. Experience with elephants in a protected contact situation preferred. Responsible for husbandry of animals, exhibit maintenance in assigned area, animal observation, medical treatment, capture/restraint and public contact. Starting salary: $23,040.00 plus excellent benefits. Submit letter of interest with detailed resumé relative to the requirements and three work-related references to: Irene Wong, City of Tucson, Human Resources, P. O. Box 27210, Tucson, AZ 85726-7210 **by 31 December 1997**. Fax: (520) 791-4236 Phone: (520) 791-4244 Ext. 121.

ZOOKEEPER/Asian Domain...requires good written/oral communication skills and the ability to work effectively in a tea-oriented environment. Associate's degree in biology or related field and three years' zoo experience preferred in the care of mammals, preferably carnivores and ungulates. A minimum of six month's experience working elephants is required. Responsibilities will include daily care and management of a diverse collection of Asian species. Duties will include behavioral observations, record keeping, assisting in veterinary procedures, capture and restraint, exhibit maintenance and interacting with the public. Will work elephants as a back-up in a free-contact program. Salary commensurate with experience. Send resumé to: Rhonda Votino, Assistant Curator of Mammals/Asian Domain, Audubon Institute, P. O. Box 4327, New Orleans, LA 70178. EOE.

ZOOKEEPER/Asian Domain (second position)...requires good written/oral communication skills and the ability to work effectively in a team-oriented environment. Associate's degree in biology or related field and three years' zoo experience preferred in the care of mammals, preferably carnivores and ungulates. A minimum of five years experience working elephants in free contact is required. Primary responsibilities will include daily care and management of 0.2 Asian elephants in a free-contact program. Also, will assist in the development of the program under the direction of the Assistant Curator. Other responsibilities will include assisting in carnivore/ungulate routines. Duties will include behavioral observations, record keeping, assisting in veterinary procedures, capture and restraint, exhibit maintenance and interacting with the public. Salary commensurate with experience. Send resumé to address listed in ad above.

ZOOKEEPER I...requires high school diploma and experience in the care/feeding/ handling of exotic animals. Experience with rhinos preferred but not required. Starting salary $9.92/hr. plus benefits. For more information and to request an application, contact Personnel Department, 103 N. Perry, Montgomery, AL 36104; phone (313) 241-2675.

INTERNSHIP...The Kentucky Reptile Zoo, a nonprofit organization, is seeking a student intern for the 1998 spring, summer, and fall seasons. The zoo is an educational exhibit, reptile breeding and venom research facility located near

Kentucky's Red River Gorge and Natural Bridge State Park. The intern will assist in the captive maintenance of the zoo's reptile collection, collect admissions to the exhibit, give interpretive talks and interact with the public, assist with educational outreach programs, and perform other duties as assigned. In addition, the intern will be responsible for the completion of at least one research project related to the field of herpetology. The intern will **not be involved** in the handling of any venomous reptiles. Desirable qualifications include a willingness to handle snakes and other reptiles on a daily basis, ability to communicate effectively with people, writing skills, orientation to details, and self-motivation. Students majoring in the biological or natural sciences are preferred. Former interns have arranged for academic credit with their colleges or universities. Benefits include experience with the most extensive and diverse collection of snakes in the area, housing, and $55/week to cover expenses. Personal transportation is recommended. Starting dates are flexible, but a minimum commitment of three (3) months covering SPRING (March-May), or SUMMER (June-August), or FALL (September-November) is required. To apply send a cover letter and resumé to: Jim Dykes, Internship Coordinator, Kentucky Reptile Zoo, 1275 Natural Bridge Road, Slade, KY 40376. **Deadlines for applications are:**: SUMMER - 1 March 1998; FALL - 1 June 1998.

CHIMPANZEE CAREGIVER...one full-time position. Requires two (2) years of college-level course work, two years experience in the care of exotic animals; OR an equivalent combination of experience which provides the required knowledge, skills and ability. Primate experience a plus. Assist in the responsibility for caring for approximately 80 chimpanzees (*Pan troglodytes*) in a breeding colony. Must be willing to make at least a two-year commitment. Excellent benefits. EOE. Applicant must have a negative TB skin test, negative hepatitis B surface antigen test, and evidence of a measles booster or natural disease prior to employment. Send letter of interest (with requested salary), resumé and three letters of reference to: Jo Fritz, Director, Primate Foundation of Arizona, P. O. Box 20027, Mesa, AZ 85277-0027. **Position open until filled**.

SENIOR KEEPER/Mammals (Pampas/Outback and Apes)...requires Bachelor's degree in biology, wildlife management, or other related field and two years paid experience in the care and management of animals in a zoological park or aquarium. Skills in supervision of personnel required and experience with great apes preferred. Responsible for supervision required to facilitate husbandry/management of a diverse collection of mammals. Starting salary $21,510.00 with regular merit increases and excellent benefits. Offer of employment contingent upon drug test. Send cover letter/resumé **by 31 December 1997** to: Mike Quick, Curator of Mammals, Sedgwick County Zoo, 5555 Zoo Blvd., Wichita, KS 67212-1628. An application will be sent to you to complete and return.

ASSISTANT CURATOR OF MAMMALS...principal functions include assisting the curator in planning, directing and coordinating the care, diet, record maintenance and propagation of an extensive mammal collection. Will also supervise full-time and seasonal staff and coordinate maintenance of exhibits. Requires a degree in zoology, biology or a related field with a minimum of three years experience in exotic animal care and a minimum of one year of supervisory experience. Must also have a valid driver's license. Starting salary $35,000.00 per year with benefit package. Resumés will be accepted **through 31 December 1997** and should be directed to: Nancy Foley, Director of Human Resources, The Toldeo Zoo, P. O. Box 4010, Toledo, OH 43609.

AVICULTURE INTERN...junior, senior or graduate student with interests in avian management/zoo biology to work with our animal care staff. 10-12 weeks. Winter, spring and summer positions available. On-site housing provided. Send resumé and three references to: Scott Barton, Curator,Tracy Aviary, 589 East 1300 South, Salt Lake City, UT 84105. **Positions open until filled.**

CURATOR OF BIRDS...requires Bachelor's degree in biology, zoology or related field; minimum of three years professional experience in a supervisory capacity in a zoo/aviary with a variety of birds. Salary: $37,000.00, plus excellent benefits. Send letter/resumé to: Richard Bayer, 1513 M. MacGregor, Houston, TX 77584.

KEEPERS (2)...the Zoological Society of San Diego is seeking two qualified keeoers for the San Clemente Island Loggerhead Shrike Project. These positions are for 9-12 months beginning January 1998. Room and board included for the five-day work week onthe island. Knowledge of artificial incubation and hand-rearing of baby birds, experience in aviculture and a degree in the Life Sciences or equivalent specialized training is preferred. Salary $13.75 per hour. Send resumé or apply at San Diego Zoo/Human Resources Office/Otto Center, P. O. Box 551, San diego, CA 92112 (ATTN: San Clemente KPR #382902). Applications are accepted M-F 1:00-4:00 p.m. **Deadline is 30 December 1997**. EOE.

ANIMAL RECORDS ASSISTANT/LIBRARIAN...processes and maintains animal records, prepares division reports and shipping documents, coordinates animal shipments and oversees the Zoo's sci-tech library. The qualified candidate will have a degree, three (3) years related experience and demonstrated competency in data entry and database management in a Windows environment. General knowledge of animal taxonomy, scientific nomenclature, animal husbandry and behavioral data collection, experience with animal records systems (ARKS) and/or knowledge of library science and general library experience is preferred. Internet experience helpful. Mid to high $20,000. Send letter or interest and resumé to: Human Resources, The Philadelphia Zoo, 3400 West Girard Ave., Philadelphia, PA 19104.

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Please note: This article was originally presented as a poster at the annual Zoological Society of San Diego's Neonatal Symposium in March 1997. For information on attending or presenting at the next Neonatal Symposium, please contact Karla Michelson, IIU Lead - Wild Animal Park Veterinary Services, (760) 735-5530.

AAZK Membership Application

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Full-time Keepers

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Other staff & volunteers

☐ **$30.00 Associate**
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